33rd Year JULY, 1949

RUBBER AGE

COMPOUNDING DISPERSIONS *for* LATEX

Simplify your latex compounding

by using our standard dispersions.

R. T. VANDERBILT CO. INC.

230 Park Avenue, New York 17, N. Y.

Use

DU PONT SELECT RUBBER COLORS

For Rubber, Neoprene and Other Elastomers

- **Produce clean, brilliant, light-fast hues**
- **Have high tinctorial strength**
- **Are economical to use**

RUBBER DISPERSED COLORS—**for Dry Elastomers—standardized dispersions in rubber prepared by a patented process.**

- **Double Dispersed**—Colloidally dispersed in natural rubber latex and coagulated—milled and blended for perfect uniformity—your assurance of maximum tinctorial strength and dispersibility.
- **Uniform**—pigment particles perfectly dispersed in natural rubber base. Each lot carefully standardized to assure uniformity.
- **Clean**—Because the pigment is dispersed in a rubber matrix, there is no fly loss . . . no dusting to dirty your plant or equipment and annoy personnel.
- **Easy to Weigh**—Rubber dispersed form means they can be accurately and easily weighed and handled.

WATER DISPERSIBLE COLORS—**for Latex—dry powder which may be dispersed for use in latex compounds by simple agitation in distilled water.**

- **No grinding equipment necessary.** Do not require expensive, time-consuming ball-milling.
- **No contamination of equipment.** Their use eliminates cleaning of equipment necessary when preparing ball-milled dispersions of conventional pigments.
- **Quick and easy to prepare.** No long grinding period required . . . no specialized equipment necessary. Just stir in distilled water and use.

DU PONT RUBBER CHEMICALS

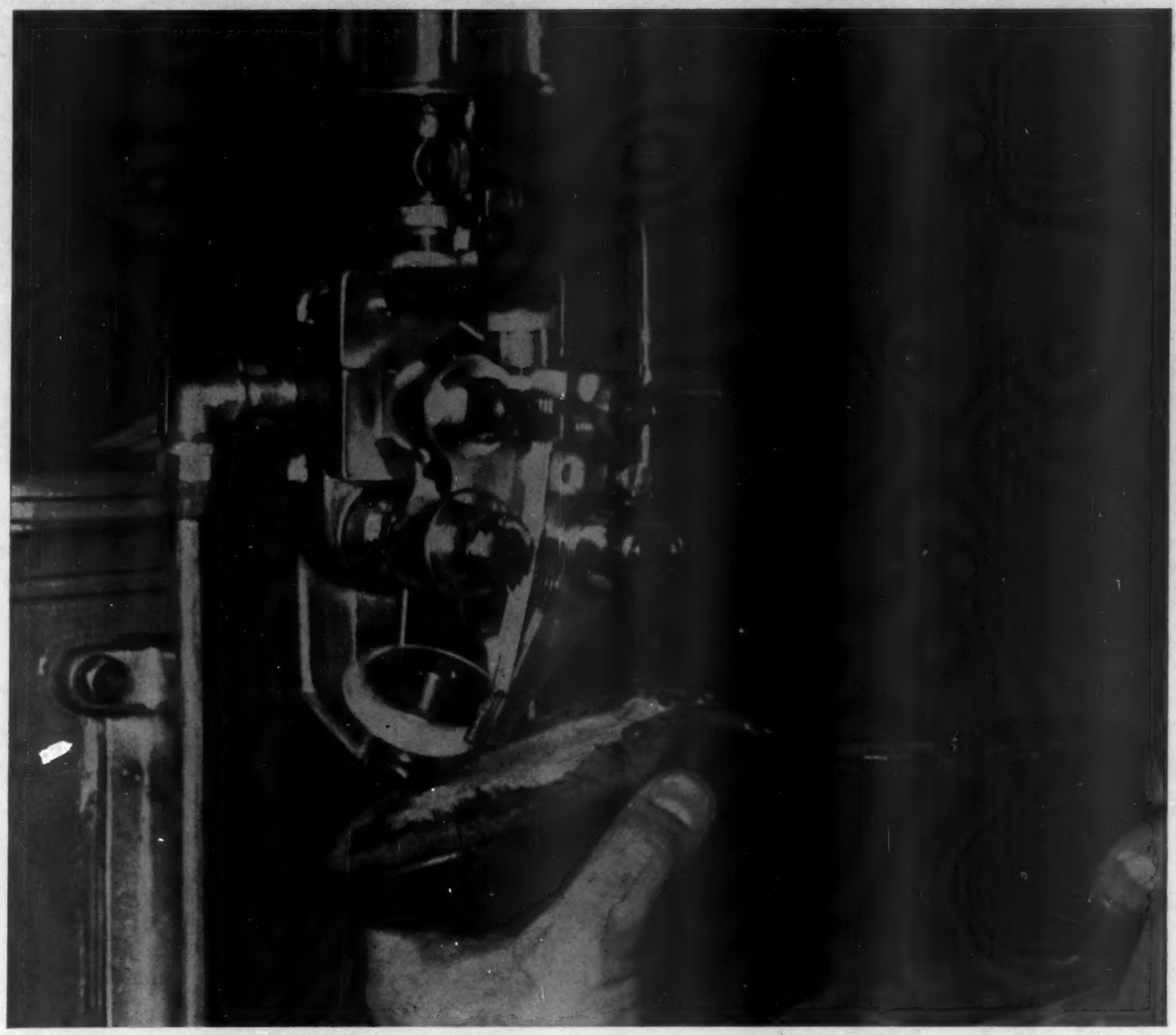
E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Del.

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

THE RUBBER AGE, published monthly by the Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. July, 1949, Vol. 65, No. 4.



Compo Bottom Cementing Machine, Compo Shoe Machinery Corp., Boston, Mass.

Millions of shoes bonded for life... as only HYCAR can do it!

THE operator pictured here is applying a special Hycar American rubber adhesive to a shoe. The adhesive will bond the sole to the upper for the life of the shoe—will resist the effects of water, oil, gasoline, sand and grit as long as the shoe wears.

It is used to bond soles made of natural and synthetic rubbers, plasticized polyvinyl chloride, polyvinyl impregnated fabric, cork and rubber, etc., to uppers made from nylon, silk, polyvinyl sheeting, coated fabrics. Millions of pairs of shoes get this Hycar "start in life" every year.

Hycar has been used for the past few years in the commercial manufacture of many types of shoe cements. This Hycar adhesive was developed by the Compo Shoe Machinery Corporation to meet the need for a permanent cement for non-leather footwear. In tests of all types of materials, only a Hycar compound met the strict requirements.

Hycar
Reg. U. S. Pat. Off.
American Rubber

Hycar American rubber is used in many applications where its outstanding resistance to heat, cold, abrasion, weather and wear are necessary to meet rigid service conditions. Hycar is light in weight, oil and gas resistant. It may be used as a modifier for phenolic resins . . . as a plasticizer . . . as an adhesive . . . as a latex for coating or impregnating.

Hycar may answer your problems —or help you develop new ideas. For complete information and technical advice, please write Dept. HB-7. B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, Ohio.

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

Philosophy—*Love of Wisdom*

Philblack® O—*The HAF black that knows how to make "cold" rubber wear longer!*

THE abrasion resistant qualities of "cold" rubber are dramatically improved by reinforcement with Philblack O; so is its ability to resist aging, cracking, cut growth and chipping. This HAF black imparts remarkably good flex life, too.

While used for the most part in tire treads (natural or "cold" rubber or GR-S) Philblack O is valuable in *all* mechanical rubber goods where abrasion resistance is important.

Send for a trial order. Available in bags or in bulk.

PHILLIPS CHEMICAL COMPANY

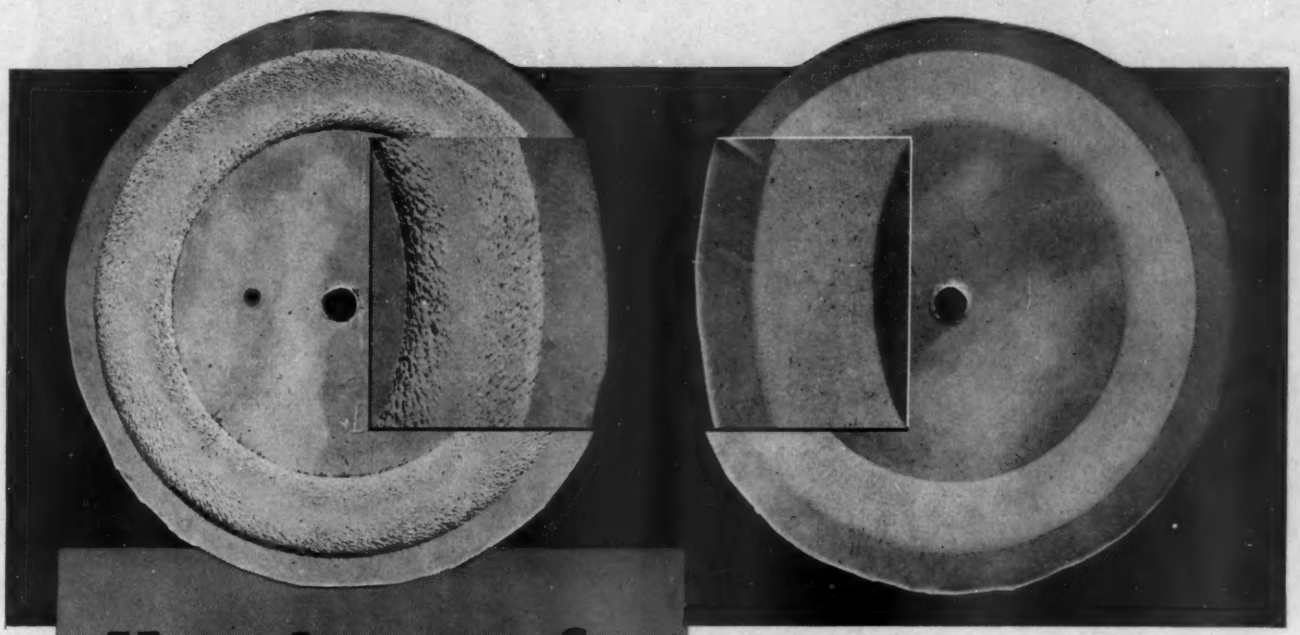
PHILBLACK SALES DIVISION

EVANS BUILDING · AKRON 8, OHIO

Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Natural Rubber Stock — abrasion loss 2.24%
(Taber abrasion H18; 1000 revolutions; 500 gms)

Same stock plus 20 parts **Pliolite S-6***—abrasion loss only 1.44%*
(conditions of test same as with first sample)



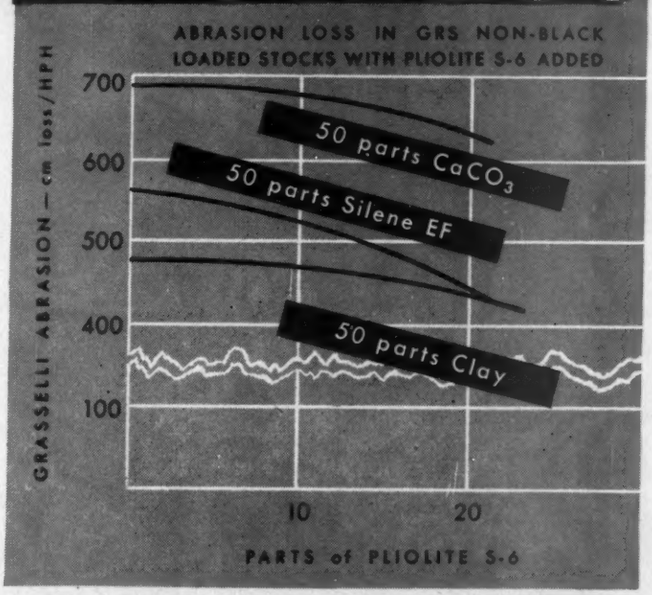
Here's proof-

you get

MORE ABRASION RESISTANCE

when you use

PLIOLITE S-6



NO DOUBT about it — you get more abrasion resistance in rubber stocks when you compound them with **Pliolite S-6.** Just look at the samples above.

The stock on the right — containing **Pliolite S-6** — shows clearly the effect of fortifying stocks with this Goodyear-developed copolymer resin. Abrasion was smooth — even — without pitting — and just about half that created in the unfortified rubber.

Besides adding abrasion resistance, **Pliolite S-6** increases stiffness, hardness and tensile. The light color of the resin makes it ideally suited for the reinforcement of light-colored stocks. You will find **Pliolite S-6** well suited for all applications needing a light-color, low-gravity stock of 70 to 100 durometer hardness with good processability and marked moldability.

You can get **Pliolite S-6** in a powder for your own mixing, or in master batches. For complete information and samples, write Goodyear,
Chemical Division,
Akron 16, Ohio.

USE PROVED *Products*

GOODYEAR

Pliolite—T.M. The Goodyear Tire & Rubber Company

Solve "scorch problems" in tire tread processing

THIS new accelerator-retarder combination offers rubber compounders important savings. First, it makes possible the full use of *all* the advantages of reinforcing furnace blacks in natural rubber tire tread formulations—*without scorching.*

Here are more advantages gained:

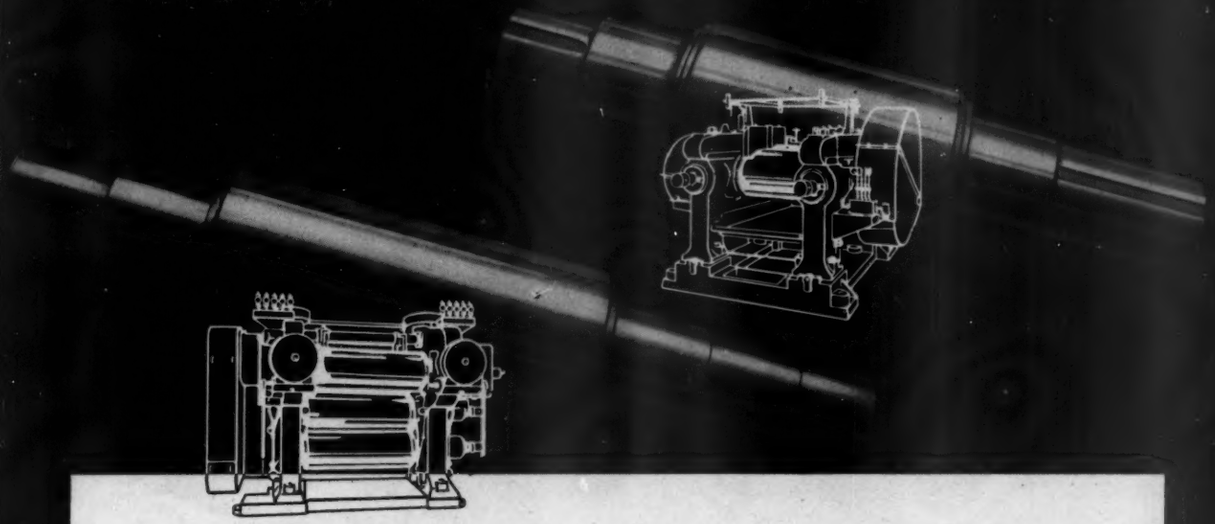
1. Low heat build-up.
2. Good flex life and high abrasion resistance.
3. Improved resilience and compression set.
4. Easy handling and processing.

Good-rite Erie is an excellent delayed action accelerator. Good-rite Vultrol is a highly effective retarder at processing temperature. Send for complete information about the properties and use of these tested and proved rubber chemicals. Please write Dept. CB-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

ROLLS—"custom-made" for your machines



The ability of Farrel-Birmingham to produce rolls to meet your needs exactly results from a century of service to the rubber industry.

Experience in building a wide variety of roll-equipped processing machines guides company engineers in selecting the proper metal mixture . . . in determining the best method of heating or cooling the roll uniformly . . . and in designing the roll to withstand the punishment it will receive in service.

Farrel-Birmingham rolls are produced in the *world's largest specialty roll shop* at Ansonia—a shop equipped to make rolls of any size required, and in many different metal formulas, of chilled iron, alloy iron, gray iron, Meehanite metal or steel. Here, each step in manufacturing is closely controlled, from metallurgical analysis of raw materials to final inspection of the finished roll.

When you need roll renewals or other processing equipment, call Farrel-Birmingham.

Farrel-Birmingham

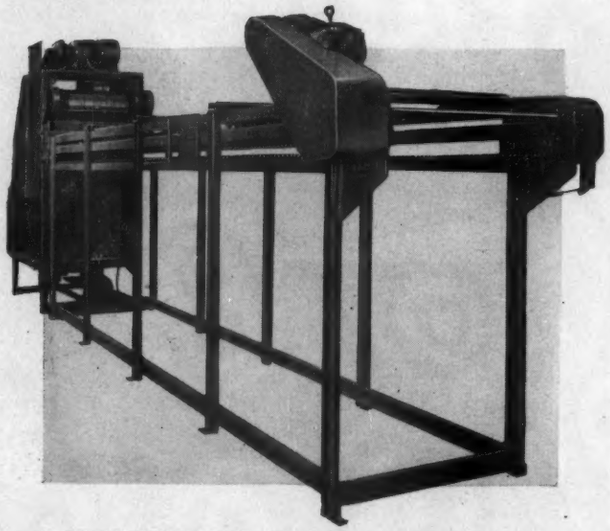
Cut your Banbury Cycle Time...

with this

AKRON-STANDARD AUTOMATIC MILL BATCH-OFF MACHINE

MILL END. *The Akron-Standard automatic batch-off machine ready to receive milled stock.*

Designed primarily to handle the mill output in connection with Banbury dump mills, this proven Akron-Standard machine distinctly shortens your Banbury cycle. It saves valuable mixing time by removing a continuous slab of stock from the mill in two minutes or less—*in a mere fraction of the time* you have heretofore needed to slab off the processed stock by hand. Your processing cycle is reduced, your stock-handling definitely speeded up. How can you possibly afford to be without this remarkable time-saving Akron-Standard equipment?



BATCH-OFF END. *Rack loading end and festoon rack in position to receive milled slab.*

Ask for our well illustrated 36-page Bulletin "A", describing this and many other types of profit-making Akron-Standard equipment.

The Akron Standard Mold Co.

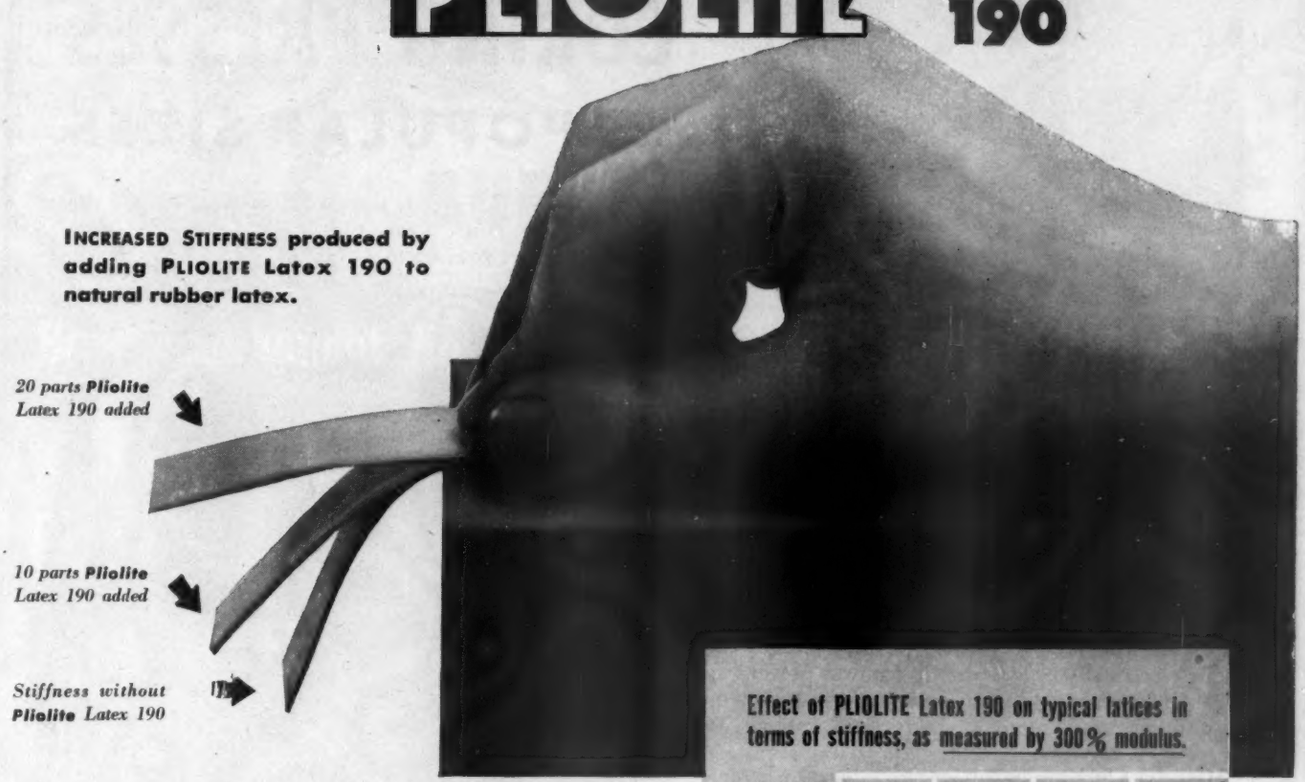
"The Established Measure of Value"

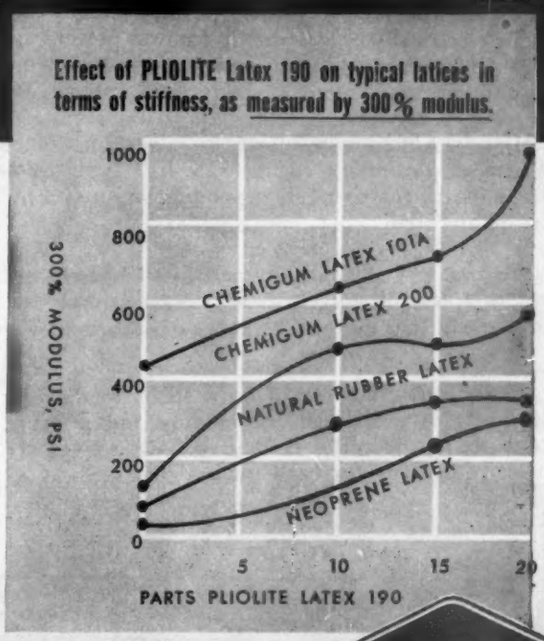
1624 Englewood Avenue Akron 5, Ohio, U. S. A.

For improved stiffness

in natural or synthetic rubber latices

use PLIOLITE Latex 190


INCREASED STIFFNESS produced by adding PLIOLITE Latex 190 to natural rubber latex.
20 parts Pliolite Latex 190 added
10 parts Pliolite Latex 190 added
Stiffness without Pliolite Latex 190



YOU can increase stiffness of both natural and synthetic latices — as shown by the chart — with **Pliolite** Latex 190. Increased hardness, tear resistance and tensile strength are also gained through use of this stabilized dispersion of a copolymer hydrocarbon resin developed by Goodyear. It will not cause coagulation.

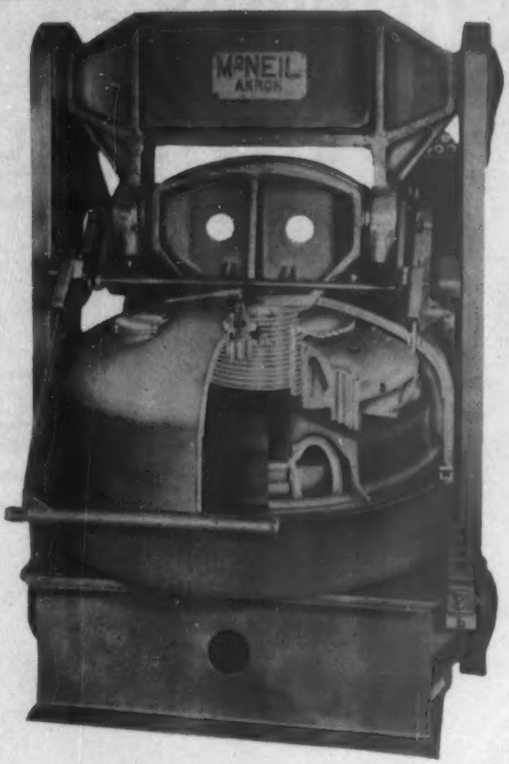
In addition, **Pliolite** Latex 190 has excellent electrical properties and low specific gravity, coupled with low water-absorption properties. Its use improves processing, and does not affect the color of the finished product, so you can use **Pliolite** Latex 190 in light-colored stocks. For full details and sample, write:

Goodyear, Chemical Division, Akron 16, Ohio.

USE PROVED *Products*

GOODYEAR

Pliolite—T. M. The Goodyear Tire & Rubber Company

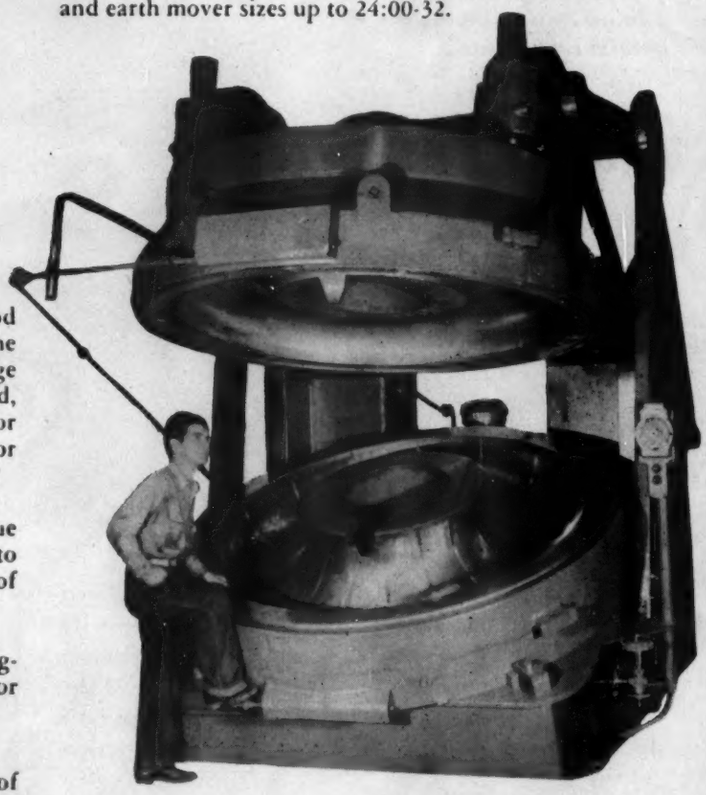


Model 675-65"-18D Single Tire Press

McNEIL

TIRE *and* TUBE CURING PRESSES IN POPULAR SIZES

Model 400 — 75" — 25, shown below, will handle the larger regular truck sizes, plus farm implement sizes and earth mover sizes up to 24:00-32.



Model 400 — 75" — 25 Tube Press

1

Labor and power saving. Our patented method for stripping any size of tire takes most of the work out of the job. One man can operate a large battery of presses. Very little power is required, as our electrically operated unit requires power for only a few seconds during each cycle, to open or close the press.

2

High production, resulting in lower costs due to almost continuous curing. One-half minute to two minutes for changes, depending upon size of tire being cured.

3

Wide range of flexibility and fast mold changing. Simple and rugged design of mechanism for adjustment to suit mold thickness.

4

Better cures, because of open steam method of curing, plus individual temperature and pressure control, plus cooling if desired. All presses are heavy duty type for high internal pressures.

All the experience and engineering skill of the McNEIL organization is at your call to help you increase efficiency and speed while lowering production costs. For tomorrow's production, check with McNEIL today.

MANUFACTURING AGENTS — GREAT BRITAIN—Francis Shaw & Co. Ltd., Manchester, England
AUSTRALIA and NEW ZEALAND—Chas. Ruwolt Proprietary, Ltd., Victoria, Australia.

THE McNEIL MACHINE & ENGINEERING CO.

96 East Crosier St. — Akron 11, Ohio

RUBBER WORKING MACHINERY • INDIVIDUAL CURING EQUIPMENT FOR TIRES, TUBES and MECHANICAL GOODS

Sharples Chemicals Inc.

has been appointed exclusive distributor to the Rubber and Flexible Plastic Industries of Burgess Pigment Company kaolin-type pigments.

BURGESS PIGMENTS

Burgess Pigment No. 20 . . .

Hydrous kaolin type pigment of highly uniform particle size, constant pH, excellent color, and maximum freedom from contaminating impurities. Filler and reinforcing pigment for natural and synthetic rubber.

Burgess Iceberg Pigment . . .

Anhydrous white kaolin pigment of carefully controlled uniformity. 90 to 92 Brightness, white pigment, extender, reinforcing agent, filler—particularly suited for Butyl and Vinyl compounds.

Burgess Polyclay . . . . . .

Hydrous type pigment of fine particle size—90 to 95% under 2 microns. Designed for synthetic rubber formulations, particularly with GR-S where a fine particle size is required for maximum reinforcing.

Burgess Pigment No. 30 . . .

Anhydrous kaolin type pigment which improves electrical qualities of Vinyl insulating compounds, excellent pigment for Vinyl compounds.

Write for specifications, prices, laboratory test data and samples.

Pigments produced by
Burgess Pigment Co.,
Paterson, N. J.

SHARPLES CHEMICALS Inc.

INTERMEDIATES FOR RUBBER CHEMICALS
ACCELERATORS, VULCANIZING AGENTS, WAX
PLASTICIZERS, POLYMERIZATION CONTROLLER

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UNITED ROLLS

MILLS . . . REFINERS . . . CRACKERS . . . CALENDERS . . . WASHERS

for processing RUBBER

PLASTICS . . . TILE

PAINT

LINOLEUM and other

NON-METALLIC MATERIALS

Whatever your processing requirements, our almost 50 years of roll making experience can help you achieve maximum satisfaction.

We'd like to prove it.

UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

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REG. T. M

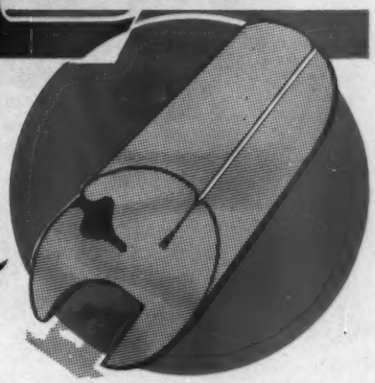
IF YOU HAVE

ADHESION TROUBLE WITH EXTRUSIONS

Extrud-O-Lube

LIQUID CONCENTRATE

Will Solve Your Problems



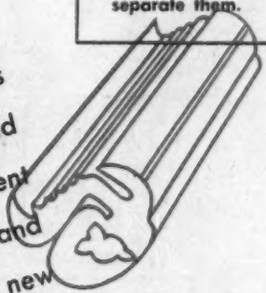
THE COSTLY WAY

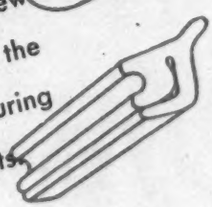
Here is a new processing aid especially developed to prevent adhesion of sealing lips of channel rubbers and other types of extruded strips, even in feather-edged forms. Clean, smooth edges, free from tackiness or adhesion, plus simplified handling results from its use.

Extrud-O-Lube imparts a strong and tenacious, yet thin film to extruded goods. It does not break down before or during cure. Through its use, costly hand labor, which is necessary in separating sticking sealing lips after cure, is practically eliminated. Then, too, rejects are reduced to a marked extent.

WHEN Extrud-O-Lube is used, lips are adhesion free—no hand labor necessary to separate them.

A sample of Extrud-O-Lube for testing and evaluation, plus technical data and suggested instructions for use, will be sent upon request. Write today and see for yourself what this new material can do for you in the way of smoother manufacturing operations and lower costs.





Also Mfrs. of

RUBBEROL SYNTHOL AND GLYCERIZED LUBRICANT

THREE OTHER FACTORY PROVED RUBBER PROCESSING AGENTS

QUALITY SINCE 1884

GENSEKE BROTHERS

RUBBER MATERIALS DIVISION

West 48th Place and Whipple Street Chicago 32, U.S.A.

for

COLORED

BUTYL INNER TUBES
MECHANICAL GOODS
DRUG SUNDRIES

use—

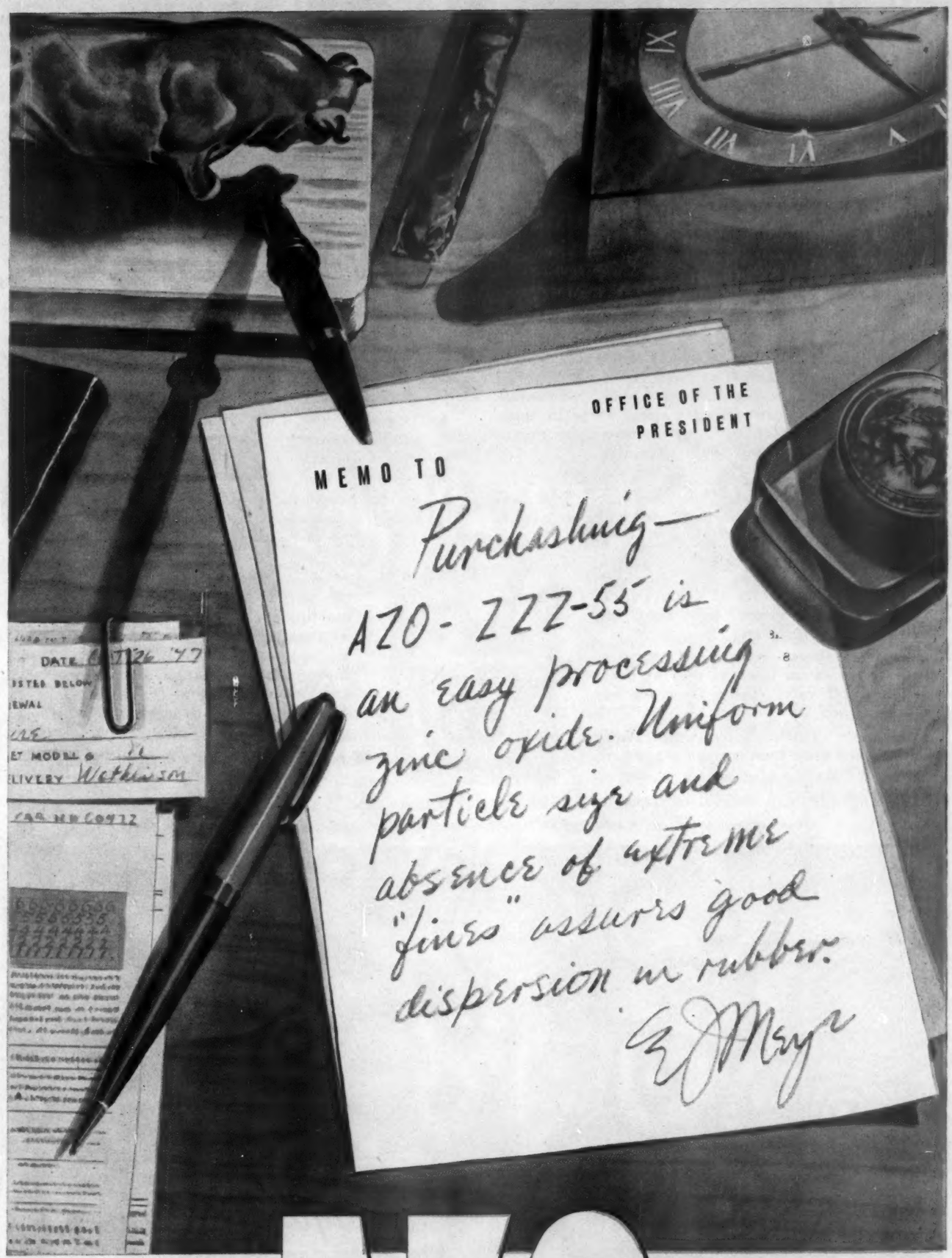
WHITETEX

● **FINE particle size white pigment. Brightness 90-92. GOOD reinforcing. Excellent *processing*.**

»» SAMPLES SENT PROMPTLY ON REQUEST. ««

SOUTHERN CLAYS, Inc.

33 RECTOR STREET
NEW YORK 6, N. Y.



Uniform-Dependable

AZO ZINC OXIDES

AMERICAN ZINC SALES CO.

Distributors for

AMERICAN ZINC, LEAD & SMELTING CO.

COLUMBUS, OHIO · CHICAGO · ST. LOUIS · NEW YORK

GOODYEAR POT HEATERS DELIVER UNIFORM CURES

with Taylor "Push-Button" Control!

96-inch Goodyear airplane tires are now cured perfectly at the push of a button. Since Goodyear installed Taylor automatic controls on their jumbo pot heaters (below), one man can deliver perfect cures in three heaters—and change curing cycles from one size tire to another by simply resetting the timer dial.

Here's what happens *automatically* when the Taylor Flex-O-Timers, Recording Pressure Gauges and Fulscope Temperature Controllers take over. Operator loads heater, pushes start button, then:

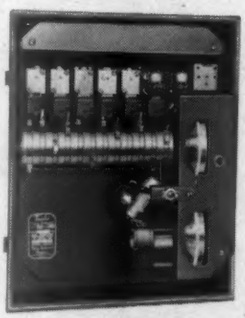
1. Sequence Timer turns on steam to bag. Signal light flashes when bag is full. After pre-steaming, timer shuts off steam, admits air to bag. "Bag Steam" light turns off, "Bag Air" light turns on.

2. Timer actuates Fulscope Controller, which opens steam inlet valves. At same time, blow-off valve closes. Operator lets air out of shell.

3. Sequence Timer stops, Cure Timer starts. When cure temperature is reached, large steam inlet valve closes and control is maintained by a smaller valve. Fulscope operates valve to discharge condensate.

4. At end of cure, Cure Timer stops and restarts Sequence Timer to complete cycle. Steam to shell shuts off. Blow-off valve opens, signal light goes out, and Timer opens spray water valve.

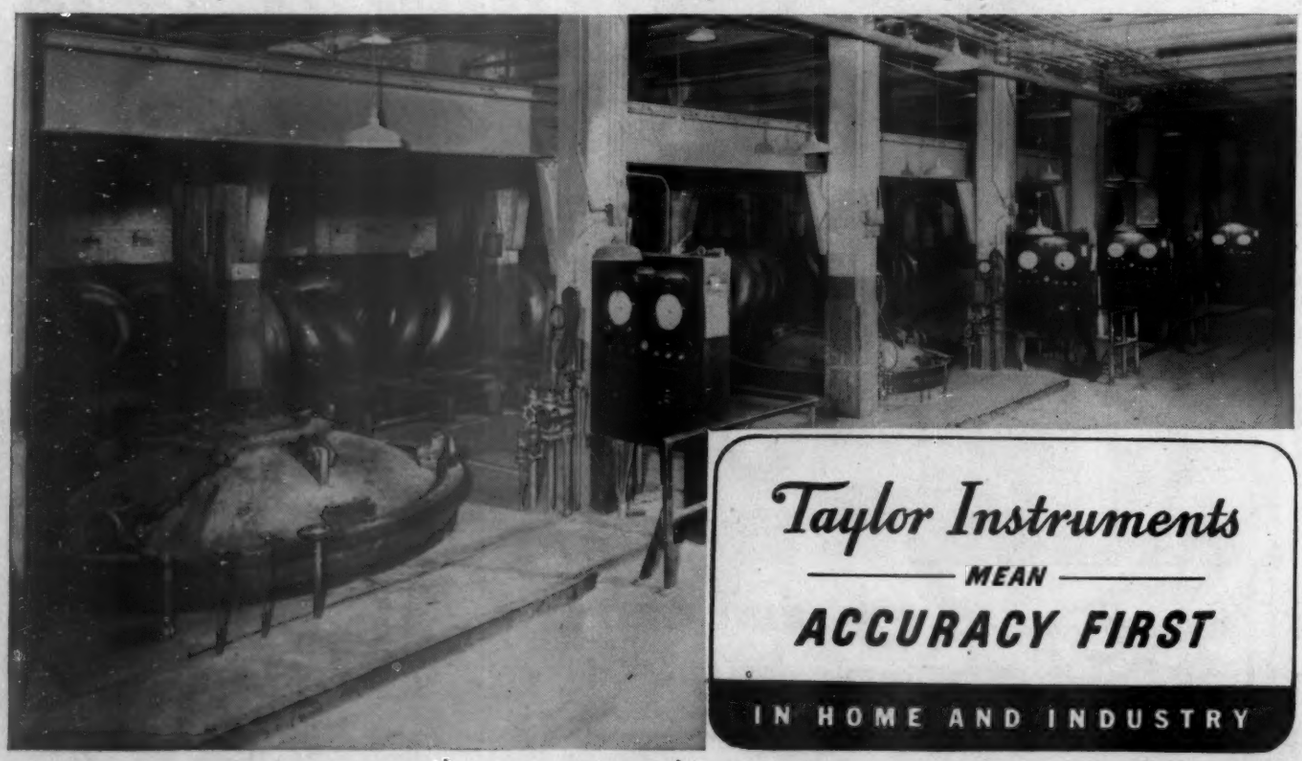
5. At end of spray period, water and blow-off valves are closed, steam valves are opened to warm up heater. Steam shuts off, Timer stops and horn blows.



In short, here is a control system that enables you to cure your product with mass-production uniformity—and to change the molding cycle from one size tire to another by turning a dial. For the *complete* story, ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording and controlling temperature, pressure, humidity, flow and liquid level.*

Just turn this dial for a different size tire

Taylor automatic controls in battery of pot heaters at Goodyear Tire and Rubber Company, Akron, Ohio.



Taylor Instruments

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY

For INSULATED WIRE, GASKETS and STEAM HOSE

NEW ALBALITH-73

(THE WATER-REPELLENT LITHOPONE)

IMPARTS LOW WATER ABSORPTION

Albalith-73 is the outstanding lithopone for use in compounds that require low water absorption... because it is specially processed, then coated with fatty acids.

Albalith-73 imparts 18% lower water absorption (2.54 vs. 3.10 mg./sq.cm.) than a typical untreated lithopone when tested by the Office of Rubber Reserve's standard method.*

Albalith-73, moreover, is similar in that feature (2.49 vs. 2.54 mg./sq.cm.) to XX-78 Zinc Oxide—which for years has been favored for use in insulated wire and other compounds of low water absorption.

Albalith-73 also has good electrical properties, facilitates processing, and imparts high resilience, together with good tensiles and tear resistance.

Take advantage of Albalith-73 in your compounds for insulated wire, steam hose, gaskets and others.

Write now for samples of Albalith-73.

*Test Method: Section D-3, Determination of Water Absorption, Specifications for Government Synthetic Rubber, R.F.C., Office of Rubber Reserve.

COMPOUND	
Smoked sheet.....	100
Sulfur.....	3
DPG	1
XX-78 Zinc Oxide	5
Pigment	24 volumes 100 volumes rubber
Cure 45 minutes @ 40 lbs.	

Duplicate specimens (2" x 5" x 0.1") of each compound were immersed in water at 70°C. for 20 hours. The increase in weight per unit area represents the water absorption and is expressed in mg. sq.cm.

Yours for the asking . . .

THE ACTIVATOR

Vol. 9 No. 1

HORSE HEAD PRODUCTS

THE NEW JERSEY ZINC COMPANY

Founded 1848

160 FRONT STREET • NEW YORK 7, N. Y.

TITANOX PIGMENTS

make bright Rain-togs that *Stay Bright*

The use of TITANOX-RA (rutile titanium dioxide) is particularly desirable for lightly loaded stocks and also sheet plastics. This pigment imparts maximum whiteness, brightness, opacity and regulates translucency as desired. Clarity of tints is outstanding.

A little TITANOX-RA goes a long way.

For heavily loaded stocks and also tints, TITANOX-RCHT (rutile-calcium pigment) is often preferred. These finely divided inert pigments promote normal aging and add resistance to discoloration.

Our Technical Service Laboratory is at your service to help you solve your rubber pigmentation problems. Write: Titanium Pigment Corporation, 111 Broadway, New York 6, N.Y.; 104 South Michigan Avenue, Chicago 3, Ill.; 2600 South Eastern Avenue, Los Angeles 22, Calif. Branches in all other principal cities.

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

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VINYLS

MONSANTO PLASTICIZERS

offer many processing advantages

SANTICIZER 141

AVAILABLE IN QUANTITY

Excellent processing action.
Low-temperature flexibility.
Flame resistance.
Light stability, resistance to embrittlement.
Low volatility.
Non-toxicity.

SANTICIZER 160

Low cost.
Excellent processing action.
High tensile and tear strength.
Low burning rate.
Oil and abrasion resistance.
Heat and light stability.

BLENDS of 141 and 160

Mixtures yield formulations with:
Economic advantages.
Excellent processing characteristics.
Good light and heat stability.
Excellent outdoor weathering properties.
Good low-temperature flexibility.
Flame resistance.
Good "hand" and drape.

Santicizers 141 and 160 are available at competitive prices for immediate shipment in any quantity. Used separately, or in combination, they will improve vinyl processing — add many desirable qualities to films, sheetings, extrusions and floor tiles.

To learn how Santicizer 141 and Santicizer 160 may be employed profitably in your operations, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Rubber Service Department, 920 Brown Street, Akron 11, Ohio.

Santicizer: Reg. U. S. Pat. Off.

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS — PLASTICS

FREE Reference Book for users of chemicals and plastics! The 28th Edition of Monsanto Catalog . . . just off the press . . . is packed with helpful information for businesses using chemicals or plastics. It contains 176 pages and fully describes more than 400 Monsanto products. Your request will bring a copy *free and postpaid.*

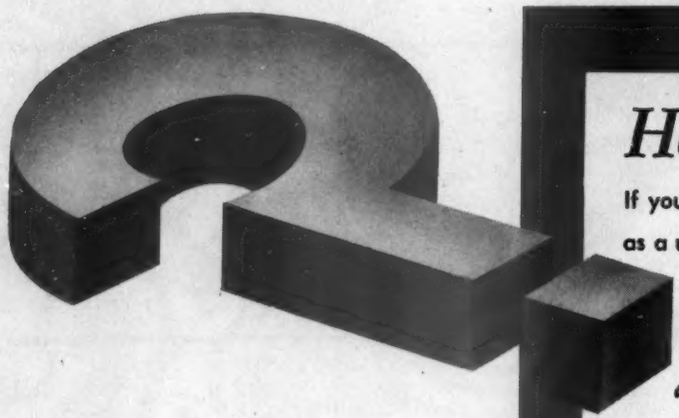
MONSANTO CHEMICAL COMPANY
Rubber Service Department
920 Brown Street, Akron 11, Ohio

Please send me: Full information on ( ) Santicizer 141, ( ) Santicizer 160.
( ) New Monsanto Catalog.

Name_____ Title_____
Company_____
Address_____
City_____ State_____

SERVING INDUSTRY . . . WHICH SERVES MANKIND

WHY St. Joe lead-free Zinc Oxide



Here is the Answer:

If you were to name the principal factors that you—as a user of zinc oxide—would consider all-important when choosing a supplier, wouldn't this be the line-up?

a. Integrity and experience of the manufacturer.

b. High quality and uniformity of the product.

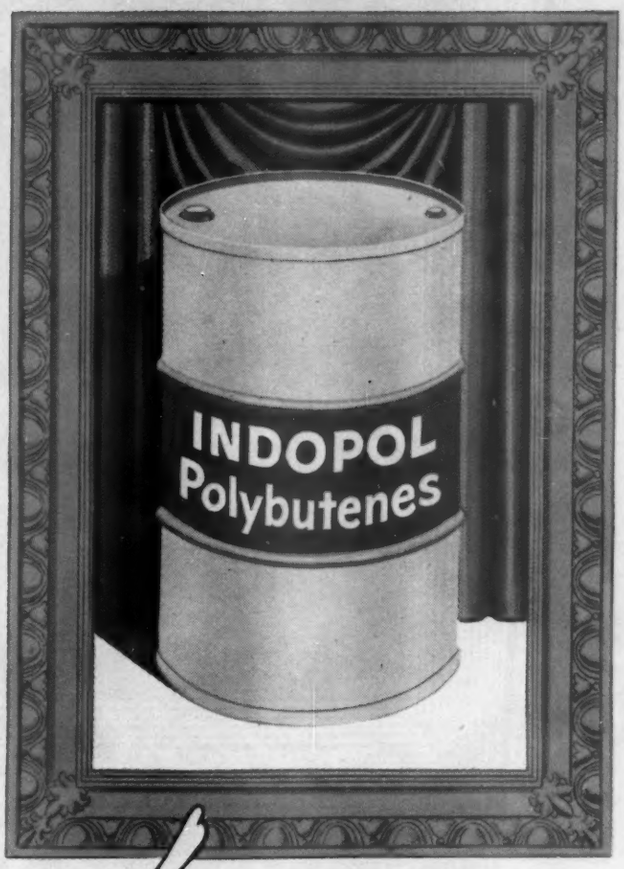
c. The producer's ability to deliver, *on time*, the precise type of pigment and the quantities you need.

On those, *and many other counts*, the St. Joseph Lead Company stands out. As a result, ST. JOE American Process, Lead-Free ZINC OXIDES have for years been specified by many manufacturers who are known for the high quality of their own products.

ST. JOSEPH LEAD COMPANY
250 PARK AVENUE • NEW YORK 17 • ELdorado 5-3200

Plant & Laboratory, Monaca, (Josephtown), Pennsylvania

Both worth looking at-



INDONEX PLASTICIZERS

For Rubber, Synthetic Rubber, Asphaltic, and Resinous Compositions

Bulletin 13 and Special Circulars

INDOPOL POLYBUTENES

For Rubber Goods, Adhesives, Mastics, Paper Products, and Tape.

Bulletin 12

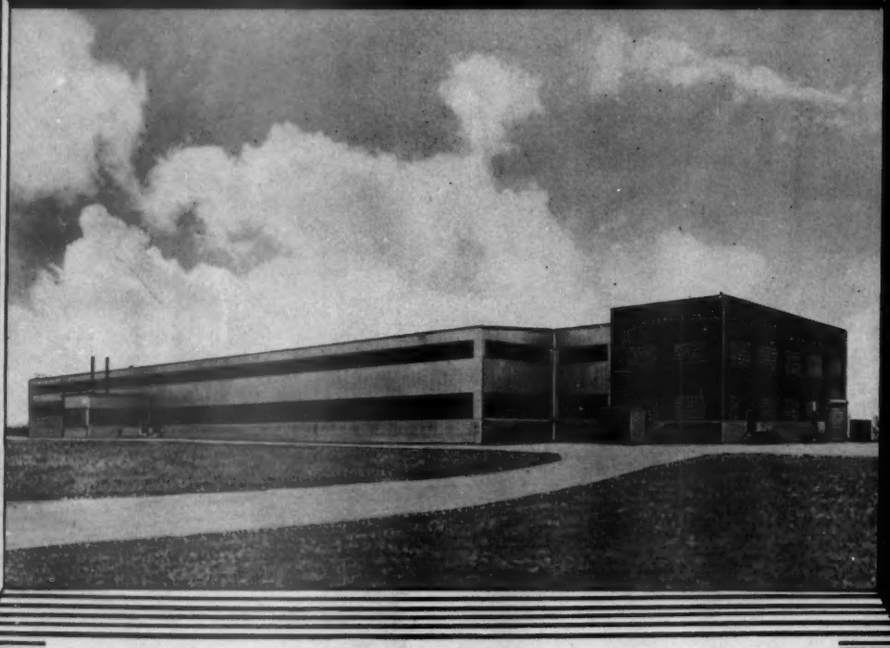
INDOIL CHEMICAL COMPANY

910 SO. MICHIGAN AVENUE • CHICAGO, ILLINOIS

INDOIL®
CHEMICAL PRODUCTS

A New Plant for
Buffalo's Latest Development

"DIP" PROCESS RECLAIMS



View of the newest U. S. Rubber Reclaiming Co. plant in the Buffalo area.

BUFFALO is proud to announce the completion of a modern plant equipped with specially designed machinery for the production of reclaims made by our revolutionary "DIP" process. Buffalo's "DIP" process represents the first basic improvement in the reclaiming of rubber in fifty years.

"DIP" process reclaims offer the following advantages to the Rubber Industry:

1. **Improved uniformity, smoothness and processing qualities.**
2. **Increased resistance to abrasion.**
3. **Superior load carrying ability without impairment of physical tests or increase in hardness.**

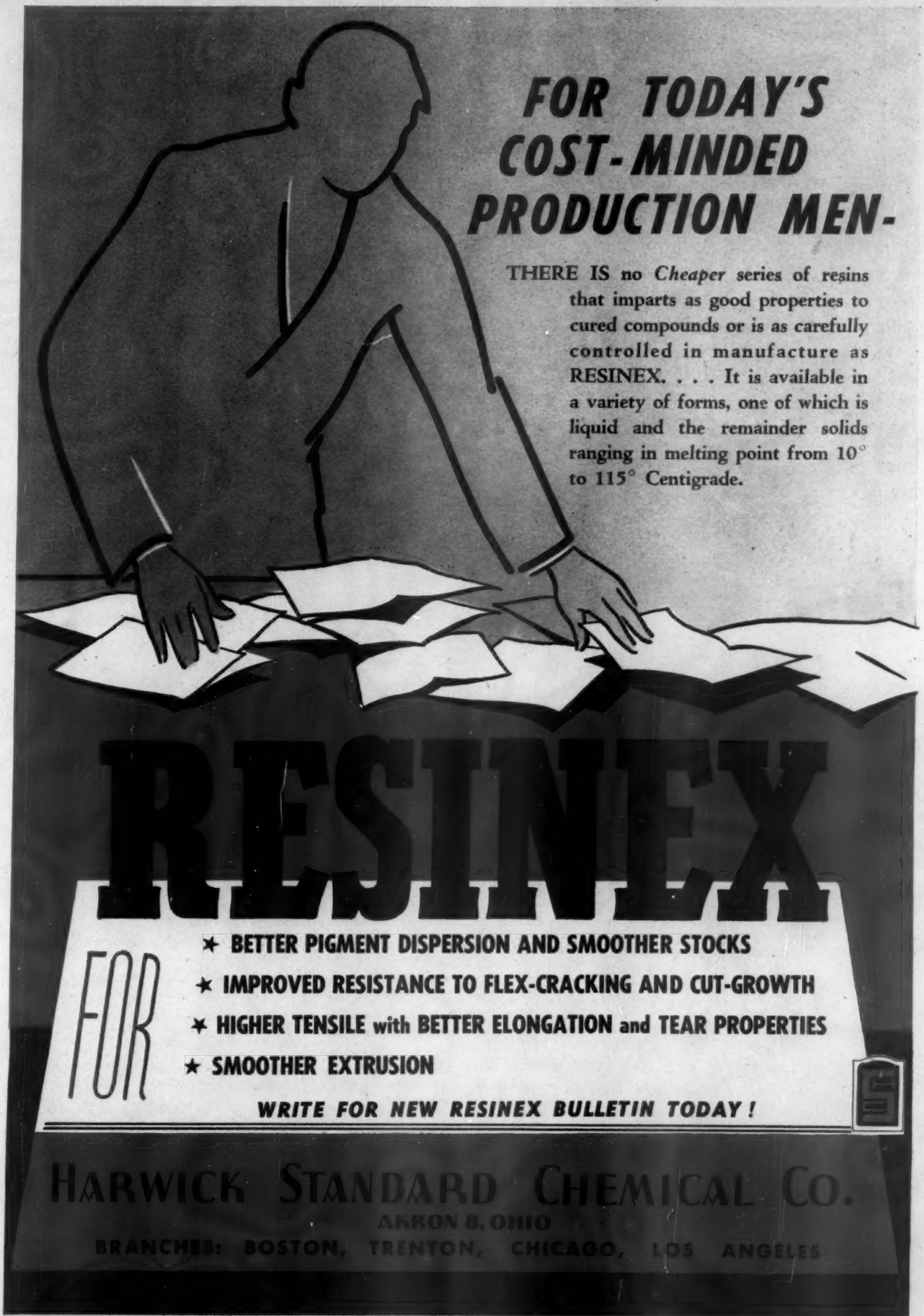
BUFFALO Technical Service offers full assistance in compound development—helps to make the use of the new "DIP" process reclaims more advantageous and profitable. Write us today for full information.

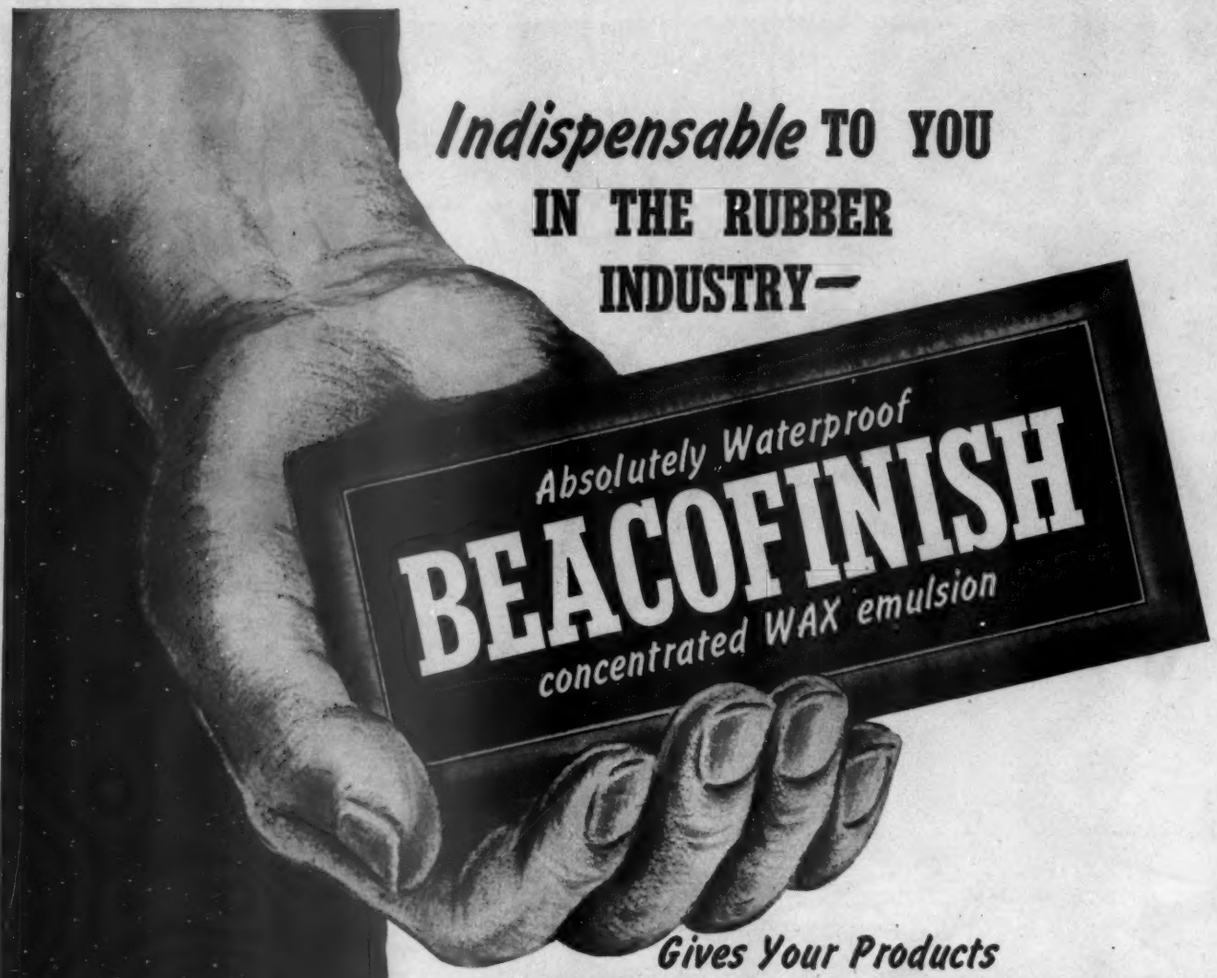
U. S. RUBBER RECLAIMING COMPANY, INC.

500 FIFTH AVE., NEW YORK 18, N. Y. (Plants at Buffalo and Cheektowaga, N. Y.)

Trenton—H. M. Royal, Inc., 689 Pennington Ave.

67 YEARS SERVING THE INDUSTRY SOLELY AS RECLAIMERS


FOR TODAY'S
COST-MINDED
PRODUCTION MEN-
THERE IS no Cheaper series of resins that imparts as good properties to cured compounds or is as carefully controlled in manufacture as RESINEX. . . . It is available in a variety of forms, one of which is liquid and the remainder solids ranging in melting point from 10° to 115° Centigrade.
RESINEX
FOR
★ BETTER PIGMENT DISPERSION AND SMOOTHER STOCKS
★ IMPROVED RESISTANCE TO FLEX-CRACKING AND CUT-GROWTH
★ HIGHER TENSILE with BETTER ELONGATION and TEAR PROPERTIES
★ SMOOTHER EXTRUSION
WRITE FOR NEW RESINEX BULLETIN TODAY!
HARWICK STANDARD CHEMICAL CO.
AKRON 8, OHIO
BRANCHES: BOSTON, TRENTON, CHICAGO, LOS ANGELES



Indispensable TO YOU IN THE RUBBER INDUSTRY—

Gives Your Products

PROTECTION and SALES APPEAL

at Little Cost!

BEACOFINISH—a unique family of coating materials conceived to give your products greater durability and eye appeal. These highly concentrated wax emulsions that can be diluted with up to four parts of water can be used with the utmost safety and economy.

BEACOFINISH is therefore of four-fold importance to you:—

1. ***It Protects*** your products against their natural enemies—air, sunlight, moisture and excessive handling.
2. ***It Improves*** the appearance of your product for its uniform coating stimulates greater consumer interest.
3. ***It's Economical*** because its high dilution potential (without losing efficiency) allows one gallon to cover 15,000 sq. ft.
4. ***It's Safe*** being a wax in water emulsion, it eliminates the fire and health hazards of volatile-solvent based finishes.

BEACOFINISH can be applied by dipping, sponging, spraying or brushing—dries in about 20 minutes—faster if force-dried—to give a hard protective coating of great elasticity.

BEACOFINISH may be ordered in Neutral or Black, in varying degrees of luster from brilliant to dull. It is so concentrated, from one drum you can obtain potentially up to five drums of superior coating for your products.

CONSULT US—WRITE US TODAY

Let us show you how BEACOFINISH can make your products more attractive and saleable—protect them from damage—you from loss—in production and transit!

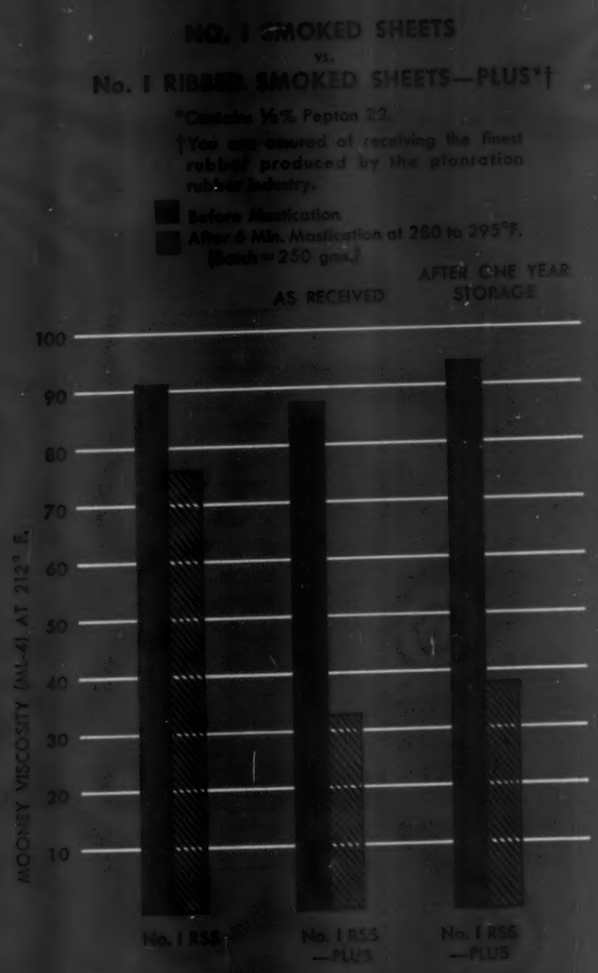
THE
BEACON
PURITY · UNIFORMITY · DEPENDABILITY
COMPANY
Chemical Manufacturers

97 BICKFORD STREET
BOSTON 30 MASSACHUSETTS

In Canada: PRESCOTT & CO., Reg'd.
774 St. PAUL ST. W. MONTREAL

PEPTON* 22 PLASTICIZER

reduces breakdown time 50% when added to latex at the plantation



Reduction of at least 50% in the amount of mastication required to obtain desired plasticity is achieved when PEPTON 22 Plasticizer is added to latex prior to coagulation.

In addition, PEPTON 22 greatly improves the processing qualities of rubber, without affecting its physical or aging characteristics.

Calco

AMERICAN Cyanamid COMPANY
CALCO CHEMICAL DIVISION
RUBBER CHEMICALS DEPARTMENT
BOUND BROOK, NEW JERSEY

MAN WANTED!

Must know how to push button!

WHERE uniform high quality demands that nothing be left to chance, you can depend on this Taylor Control System. It gives you *complete control* of sequence and duration of operations plus *complete control* of platen temperature and condensate removal. Once the operator pushes a starter button, here's what this system does:

1. Controls all timing sequences from the moment the press is started until the finished product is ready for removal.

2. Controls temperature during the heating cycle. Also controls automatic change-over to cooling (where necessary) at the end of the molding period.

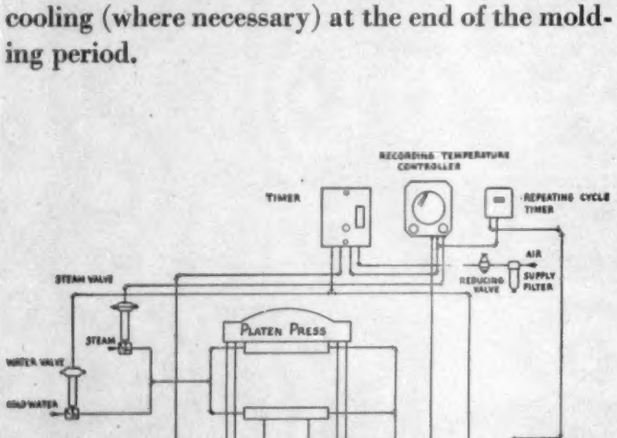
3. Provides automatic removal of condensate during the heating cycle, requiring no separate traps.

4. Provides automatic "bumping" or "gassing" (when necessary).

This system is so flexible that you can change the time cycle without cutting of cams. And you can change the molding period independent of the balance of the cycle by means of the Auxiliary Timer. *And*, the Fulscope Temperature Controller is fully adjustable for all temperature changes within its range. Interested? Ask your Taylor Field Engineer! Taylor Instrument Companies, Rochester, N. Y., and Toronto, Ontario.

▼ ▼ ▼

Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow and liquid level.



Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

4 BAKER CHEMICALS of interest to The Rubber Industry

MAGNESIUM OXIDE
(Neoprene Grade)

A very light, finely-divided powder completely uniform in bulk density, particle size, and chemical activity. Calcined in electric furnaces to insure dependable performance when it is compounded with neoprene and other synthetic rubbers.

MAGNESIUM CARBONATE
(Technical Light Powder)

Particular emphasis is placed on uniformity of physical specifications, which reflect in trouble-free compounding of rubber products. Impurities such as iron and calcium are extremely low due to exacting chemical control.

CALCIUM NITRATE
(Technical Crystal)

A high purity chemical especially manufactured to meet the requirements of compounders of latex products. It is produced as creamy-white crystals 1½" and smaller in diameter, containing 3 molecules of water of crystallization.

CARBON DISULFIDE
(Carbon Bisulfide)

Freedom from other sulfides (Assay of 99.99%) makes Baker's carbon Disulfide a preferred solvent in the rubber industry. Manufacture by a unique electro-thermic method, with continuous rather than batch distillations, insures uniformity.

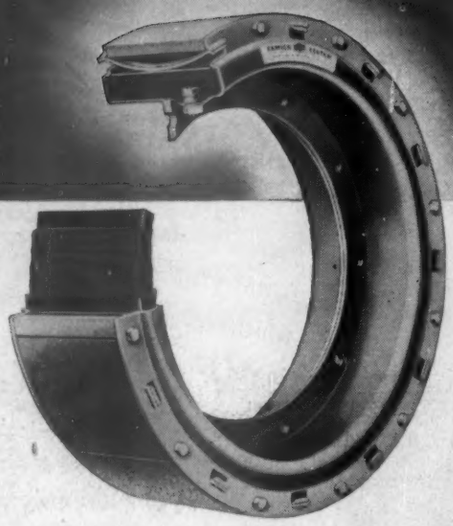
J. T. BAKER CHEMICAL CO.
Executive Offices: Phillipsburg, N. J.

Baker's Chemicals

C.P. ANALYZED — FINE — INDUSTRIAL

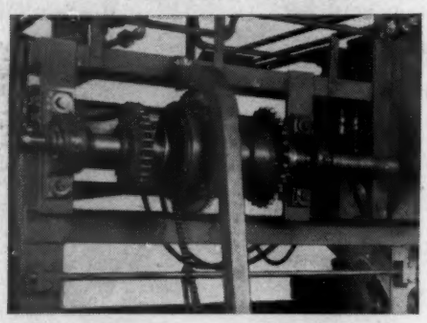
FAWICK-EQUIPPED MACHINES

do More Work at Less Cost

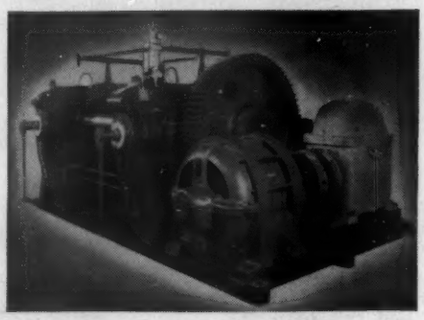


Fawick Air-Ring Clutch or Brake Type E

Fawick Airflex Clutch and Brake on three mill line at Ace Rubber Products Co., Akron, Ohio.



Fawick Airflex element on 36" Tread Skiver by National Rubber Machinery Co., Columbiana, Ohio.



Fawick Airflex Clutch and Brake on Standard No. 7 Heavy-Duty Warming Mill by Stewart Bolling & Co., Inc., Cleveland, Ohio.

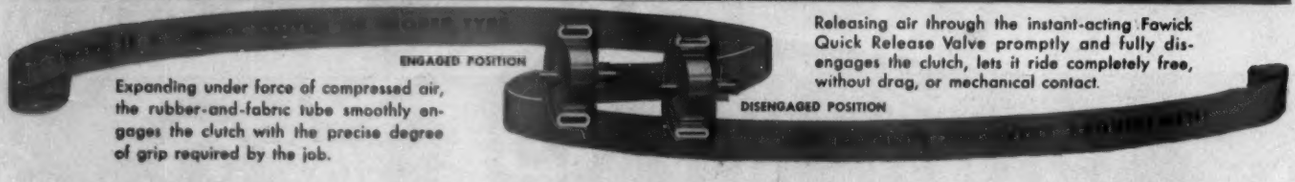
Time-wasting clutch adjustment down time is practically eliminated on Fawick-equipped machines. The moving parts of this Fawick Clutch—the rubber-and-fabric pneumatic tube and the friction shoe assemblies—adjust automatically and compensate for wear.

The smooth engagement action of this Fawick Clutch eliminates sudden shock loads which damage machinery. Controlled torque starting can be obtained with a simple modulating air valve. This type Fawick Clutch is ideally suited to continuous slip applications.

For specific recommendations for your machines, write to our Engineering Department today. Address Dept. RA.

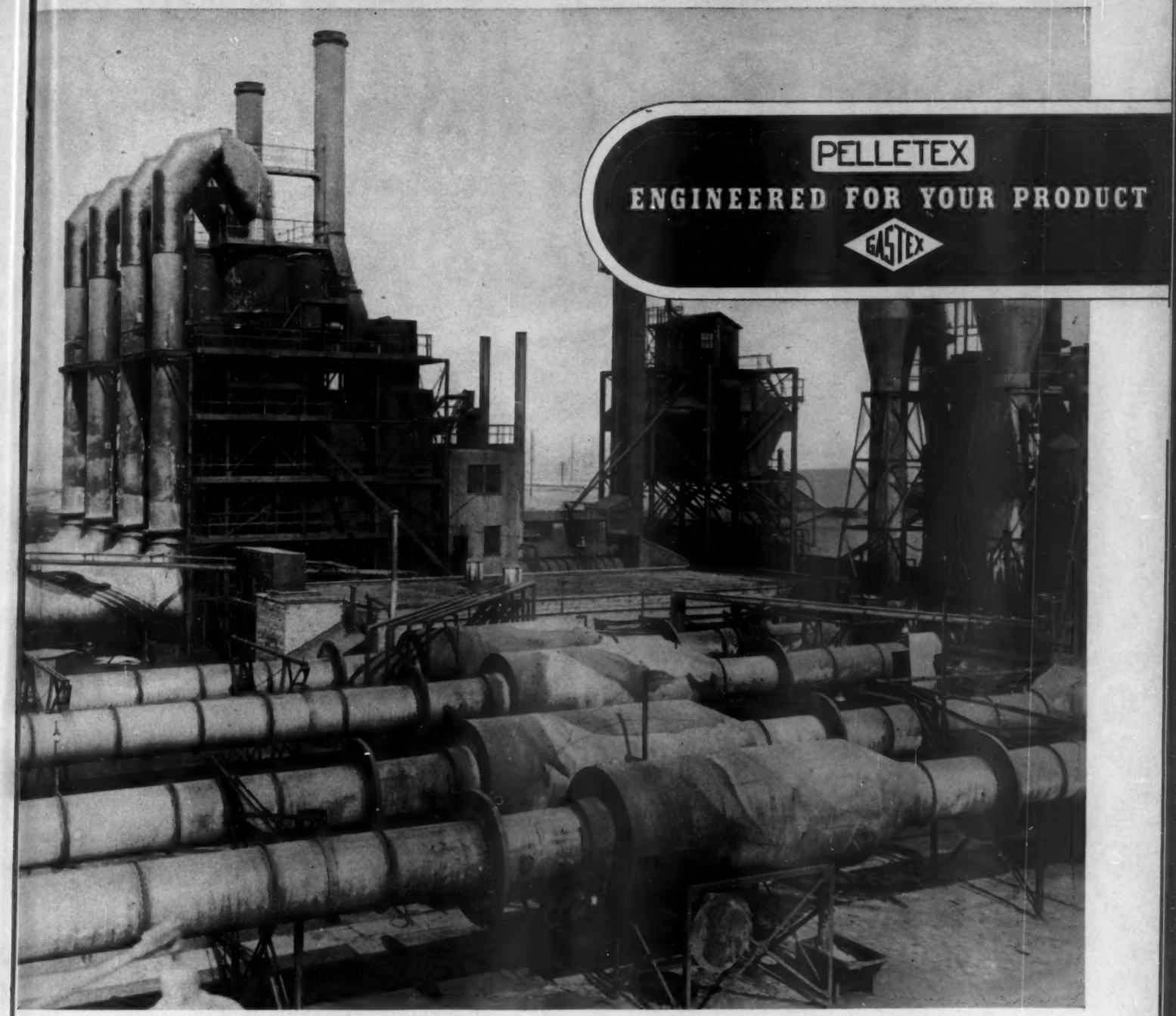
FAWICK Airflex CO., INC.

9919 CLINTON ROAD CLEVELAND 11, OHIO



Expanding under force of compressed air, the rubber-and-fabric tube smoothly engages the clutch with the precise degree of grip required by the job.

Releasing air through the instant-acting Fawick Quick Release Valve promptly and fully disengages the clutch, lets it ride completely free, without drag, or mechanical contact.



PELLETEX—*the carbon black to meet high quality specifications*

Water sprays inside these flues cool PELLETEX en route to the Cottrell Precipitators from General Atlas fiery furnaces . . . an important step requiring precise control in the journey of PELLETEX to the consumers' finest compounds.

CABOT

The GENERAL ATLAS Carbon Co.

77 FRANKLIN STREET, BOSTON 10, MASS.

Herron Bros. & Meyer Inc., New York and Akron • Herron & Meyer of Chicago, Chicago • Raw Materials Company, Boston • H. N. Richards Company, Trenton
The B. E. Dougherty Company, Los Angeles and San Francisco • Delacour-Gorrie Limited, Toronto

How to obtain *effective age-resistance*

without discoloration or stain

WHITE SIDEWALL TIRES. Added to rubber compounds from which "white sidewalls" are fabricated, Koppers DBPC give age-resistance without causing discoloration.

MOST rubber compounds require the addition of an anti-oxidant material for age-resisting properties . . . to prevent cracking, checking, hardening and loss of strength. But most anti-oxidants tend to discolor the finished product or to stain materials with which they come in contact.

For white rubber products . . . white sidewall tires, crepe-soled shoes, sponge rubber cushions, sanitary goods, refrigerator gaskets, and the like . . . Koppers offers you Di-tert-butyl para-cresol (DBPC). Tests have shown that DBPC is an effective anti-oxidant with non-discoloring and non-staining qualities.

Koppers invites you to test DBPC in your own laboratories. Write for an experimental sample and for a copy of Technical Bulletin C-8-115.

KOPPERS

KOPPERS COMPANY, INC.

Chemical Division

Pittsburgh 19, Pa.

CARBON BLACK *Served 1949 Style*

OPEN OUTER BAG ONLY AT BANBURY
Add sealed film package containing 25 lbs. of carbon black directly to Mixer.

CABOT

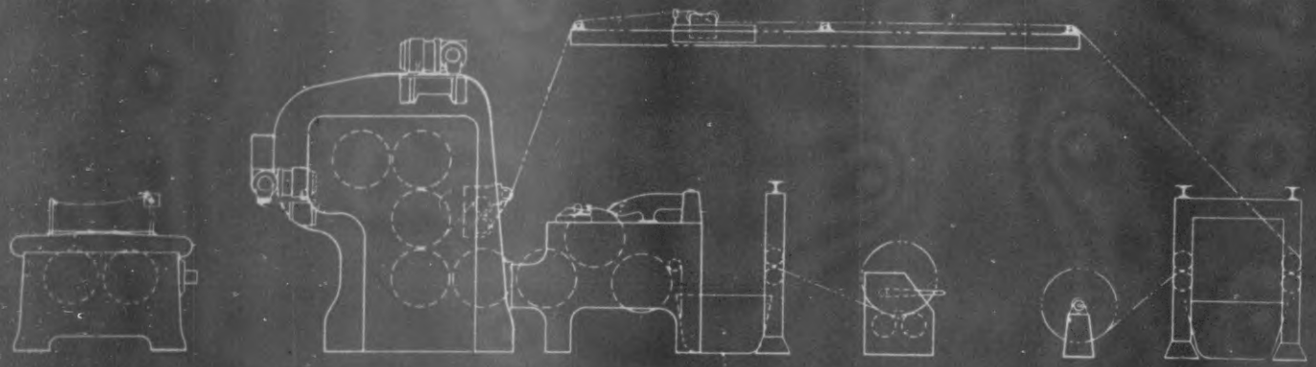
Banbury Mixer Receives Carbon Black In New Miscible Polymer Film Package

Entirely Compatible With Most Rubber Compounds

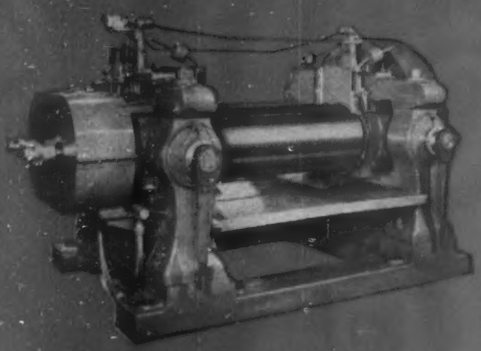
GODFREY L. CABOT INC.

77 FRANKLIN STREET, BOSTON 10, MASSACHUSETTS

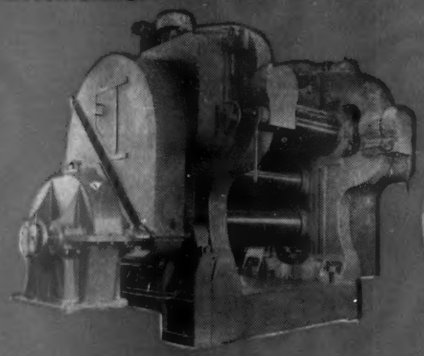
Engineered Equipment *for Continuous Processes*



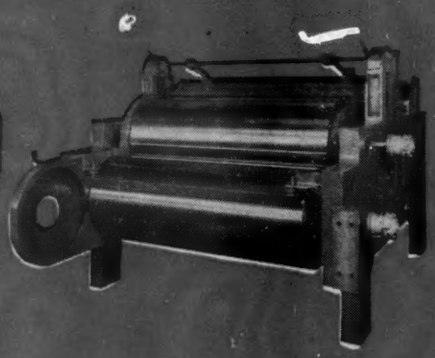
Continuous Calendering Process for supported or unsupported plastic sheet. Equipment includes fabric let-off stand with accumulator scray, fabric centering device, fabric pre-heating rolls, four-roll Calender, cooling rolls, and fabric wind-up with accumulator scray. Also included are facilities for trimming and winding up unsupported sheet. A stock warming up Mill is included, with stock transfer feeding conveyors as required.



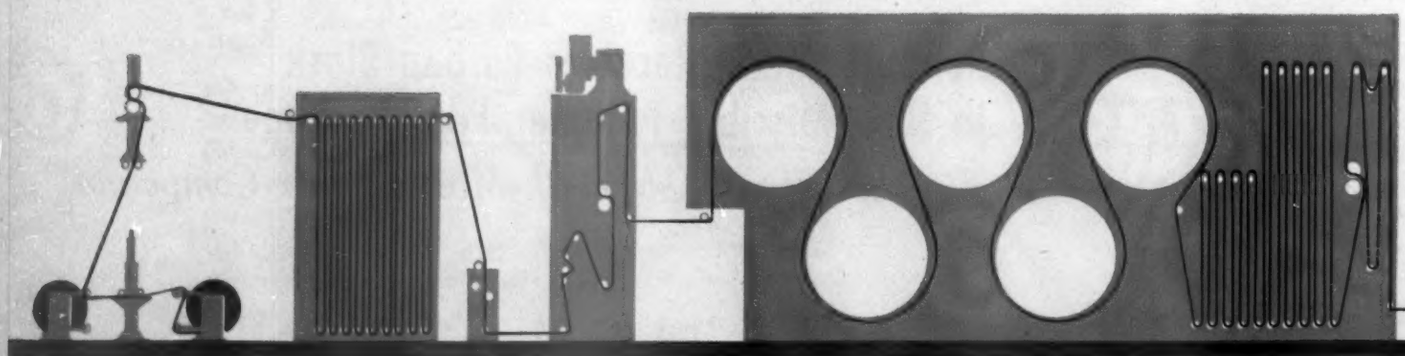
Warming and mixing Mill for plastics, 22" and 32" x 60", equipped with oil flood lubrication system, high pressure rotary joints, and tiltable stock guides.



Four-roll Calender for plastics, 24" x 68", including oil flood lubrication system, bored rolls, adjustable stock guides, high pressure rotary joints, motorized two-speed roll adjustment, and hydraulic roll stabilizing equipment.



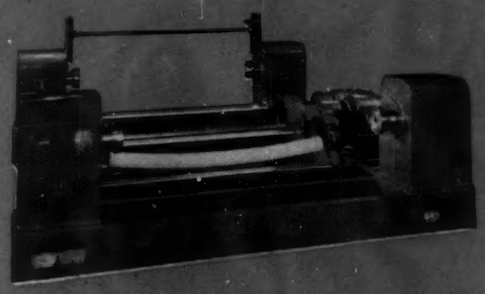
Film and Fabric Cooling Roll Unit, with film trimming and wind-up device for mounting at the Calender.



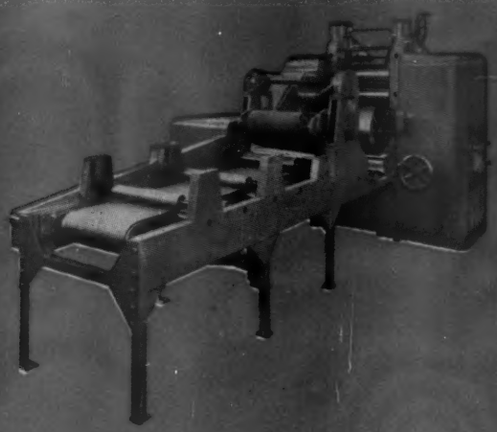
Continuous tire fabric processing unit, including pre-dipping, drying, calendering, cooling, and wind-up equipment.

We engineer, build and install continuous processing equipment for the manufacturer of rubber or plastics products. Your inquiry concerning special or unusual requirements is invited. Our engineers are available for consultation.

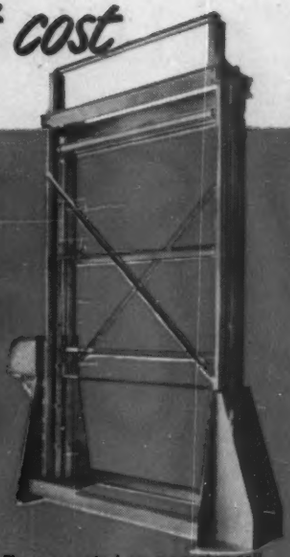
Improve product quality–lower product cost



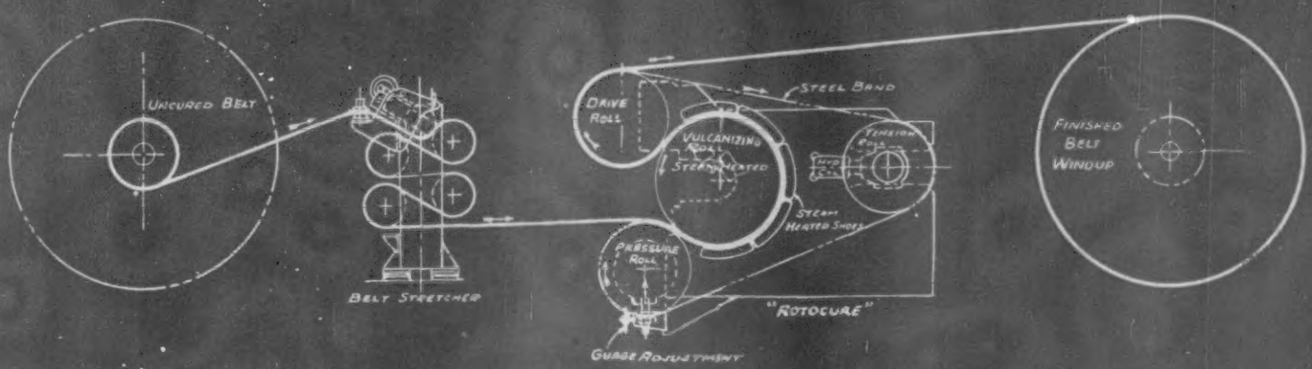
Unit for winding rubber sheeting on curing drums. Included are motor drive, stock let-off stand with liner wind-up and fabric let-off stand.



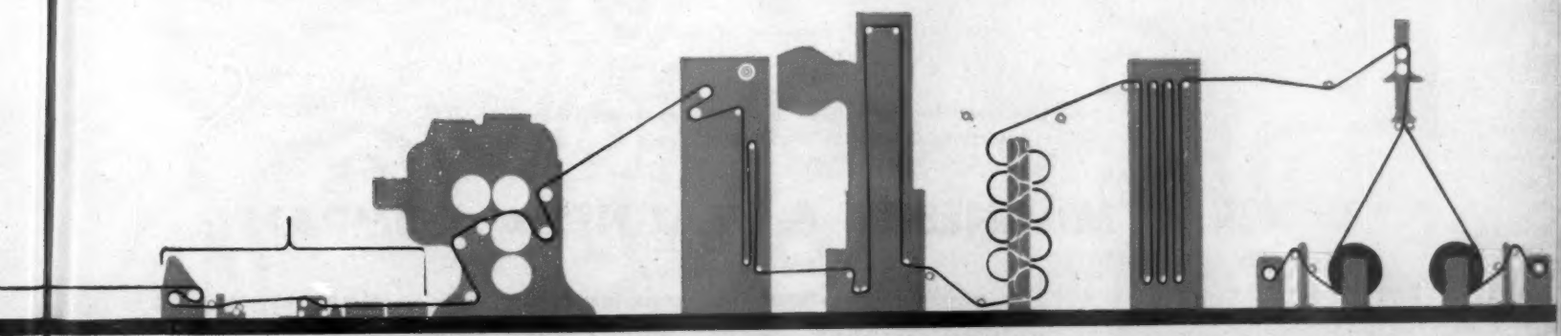
Combination Cooling, Slitting and Double Wind-Up Equipment for plastic film for use with four-roll Laboratory Calender.



Floor-mounted compensator roll stand used for coordinating the speed of machines in a continuous fabric processing installation.



"ROTOCURE" process for continuous vulcanization of belting and floor matting. The stretcher is not used when running matting. Built under license from Boston Woven Hose & Rubber Company.



ADAMSON UNITED COMPANY

AKRON, OHIO

SUBSIDIARY OF UNITED ENGINEERING & FOUNDRY COMPANY

Branch Offices: NEW YORK: 441 Lexington Ave.
CHICAGO: 140 S. Clark St.
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NOW Calcined Magnesia in LUMP Form—GENMAG TECHNICAL

FOR IMPROVED SCORCH RESISTANCE IN NEOPRENE COMPOUNDING

There has always been loss of efficiency when calcined magnesia has been pulverized into a powder, for the powder has great affinity for moisture and carbon dioxide — which lower its scorch resistance in neoprene compounding. So now General Magnesite & Magnesia Company has made available calcined magnesia in *lump* form.

To further safeguard this lump magnesia from deterioration by contact with carbon dioxide and moisture while in transit or storage, it is packaged in heat-sealed polyethylene bags.

Dispersion in compoundings is equal to that of powdered magnesia.

Disinterested tests show that stresses in Banbury Mixers and rubber mills are so great that dispersion of lump magnesia is equal to dispersion of GENMAG TECHNICAL powdered magnesia, and scorch resistance is greatly improved.

PROTECTED! BY POLYETHYLENE BAGS

Polyethylene used for packaging protects the calcined magnesia lumps from carbon dioxide and moisture. The package is dumped into the mixer or mill unopened.

Ask for three page technical bulletin with independent laboratory data, describing GENMAG TECHNICAL Lump Magnesia.

GENERAL MAGNESITE & MAGNESIA COMPANY

Specialist in Magnesia

Box 671 **MANUFACTURERS—IMPORTERS—DISTRIBUTORS** **NORRISTOWN, PA.**

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Harwick Standard Chemical Co.
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Standard Chemical Co., Ltd.

Production Really Rolls with Mt. Vernon Fabrics

Consistent fabric quality can make a great difference in the quality and efficiency of calendering operations. That's why producers of calendered products rate Mt. Vernon fabrics so highly—they are aware of their high degree of uniformity, the result of being made from top grades of cotton under rigid laboratory controls. They know how much Mt. Vernon fabrics contribute to smooth, uninterrupted operations—to quality products.

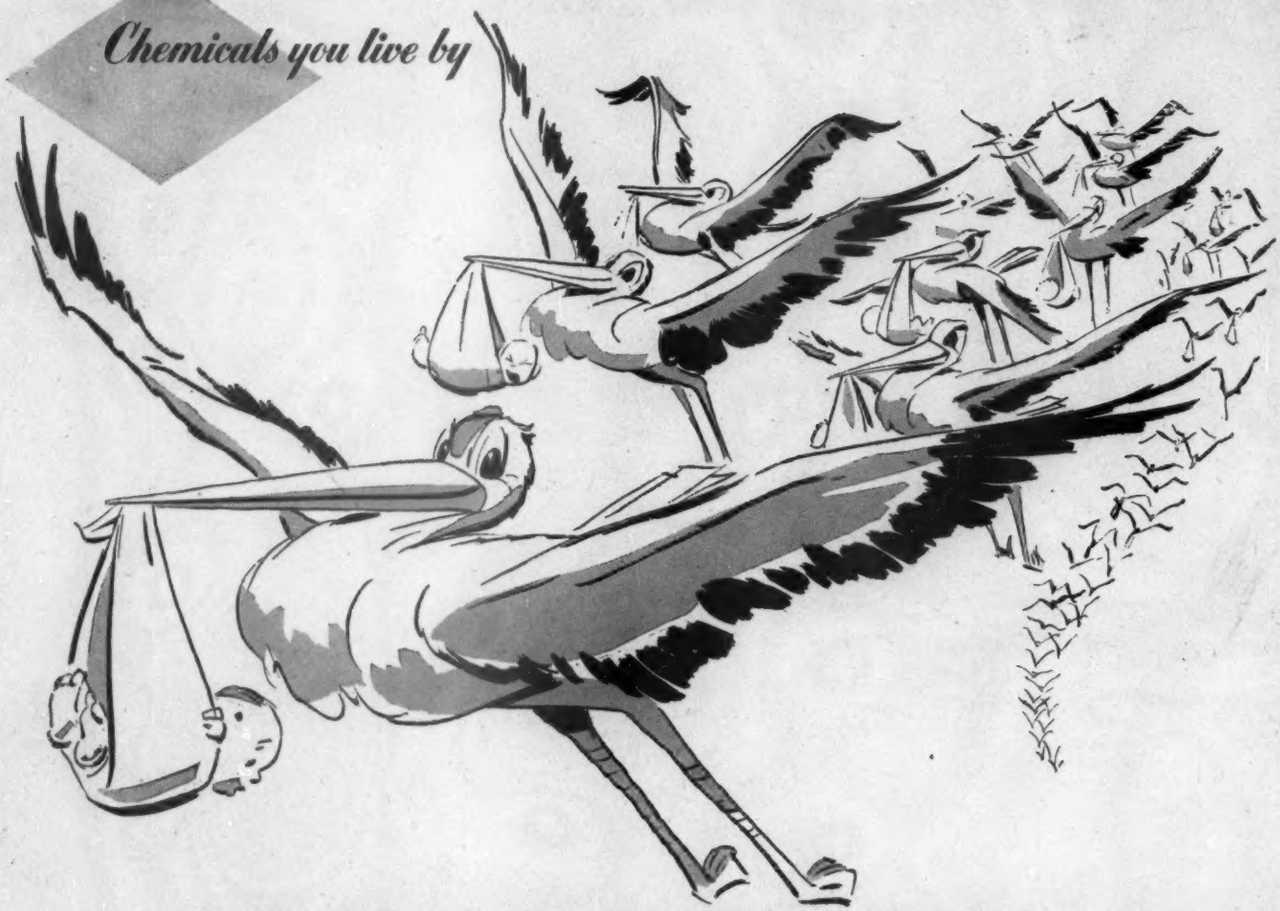
For fabrics that mean better rubber products, faster production, specify Mt. Vernon.

Mt. Vernon-Woodberry Mills

TURNER HALSEY
COMPANY
Selling Agents
40 WORTH ST. • NEW YORK

Branch Offices: CHICAGO • ATLANTA • BALTIMORE • BOSTON • LOS ANGELES • AKRON

Chemicals you live by



Multiplying your need for Multifex

Rubber and plastic products for babies are being improved in quality by the incorporation of MULTIFEX, an ultrafine, non-abrasive precipitated calcium carbonate made by DIAMOND ALKALI. For MULTIFEX increases resistance to tear and to deterioration of many plastics and of light-colored natural and synthetic rubber.

MULTIFEX is available in three grades to meet your particular needs:

1. **MULTIFEX**: .03 to .04 microns in particle size. White. Uncoated. Highly reinforcing in natural rubber and imparts tear resistance (both hot and cold), high tensile strength and elongation with low modulus.

2. **SUPER-MULTIFEX**: .03 to .04 microns. White. Coated with two different coating agents. Acts similar to MULTIFEX except for slightly higher elongation and somewhat lower modulus. Recommended especially for high hot-tear resistance. Coating acts as a lubricant, improving dispersion and giving good flowing stock in molding compounds.

3. **MULTIFEX MM**: differs from MULTIFEX only in particle size which is .05 to .06 microns. Easier to incorporate and in many instances provides quality equal to finer grades due to more complete dispersion.

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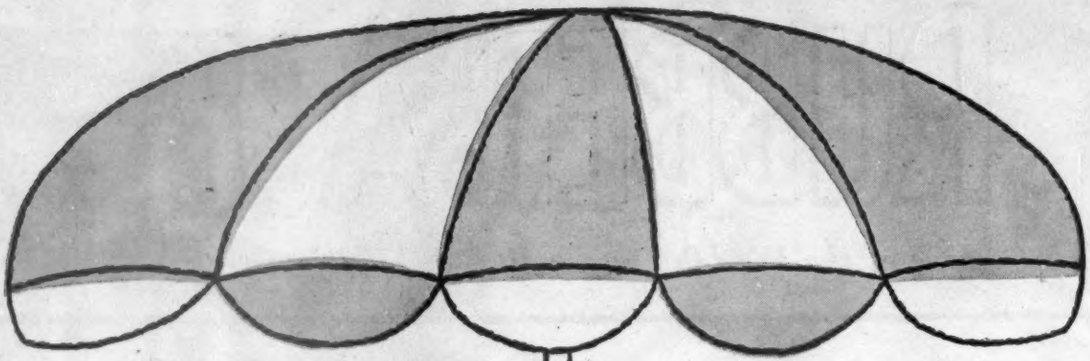

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RUBBER AGE

Vol. 65, No. 4 JULY, 1949

The Compounding of Hard Rubber (Natural and Synthetic)

By W. MURRAY GALL

Chief Chemist, Luzerne Rubber Co., Trenton, N. J.

HARD rubber, frequently called ebonite, is a material which has many desirable physical and chemical properties. The relatively new plastics industry has offered stiff competition, yet it is reasonably safe to say that, for certain applications, nothing else can be substituted for hard rubber and still maintain its unique properties.

One of the principal qualities of this material is its finished appearance. When a high grade ebonite compound is properly processed, it can be given a high lustrous finish which sets it apart from similar materials for beauty and richness. The highest grade of hard rubber is a compound containing only rubber and sulfur. It is in this type of compound that maximum physical properties and highest lustre are found.

Applications

The use of ebonite in specific applications is, of course, dependent on its physical and chemical properties. However, its attractive appearance has led to its use for articles wherein "eye-appeal" is as necessary as physical and chemical stability. Examples of such articles are combs, trays, toilet seats, steering wheels, pipe stems, drug sundries, bowling balls, etc. There are numerous other applications where the standard of appearance is not all-important, such as tank and pipe lining, battery cases, electrical parts, etc. For these uses, another inherent property is utilized, namely, chemical inertness. Hard rubber of almost any grade offers great resistance to chemical corrosion. For this reason, the hard rubber industry plays an important part in the chemical equipment field, where it is used extensively for lining tanks and pipes, for covering agitators, valves, fans, etc.

All of the aforementioned information is applicable to hard rubber made from both natural and synthetic rubber. Generally speaking, natural rubber is to be preferred, as it gives somewhat better physical properties. One important advantage of natural rubber is its ease of processing. Despite the great deal of work that has been done on improving the processing characteristics of synthetic rubber, i.e., GR-S, the fact remains that natural rubber is easier to process than its synthetic counterpart. During the recent crude rubber shortage, however, various synthetic polymers were substituted very successfully, and it is probable that in the future synthetic rubber will be used for special applications. One difference between natural rubber ebonite and synthetic rubber ebonite is that a higher lustre is obtained with the former. This property appears to be inherent with the polymer, but the difference is not too outstanding.

Sulfur Ratios

Strictly speaking, true hard rubber or ebonite contains 47% of sulfur and corresponds to the empirical formula $(C_5H_8S)x$. Generally speaking, the term "hard rubber" includes compounds which contain at least 25

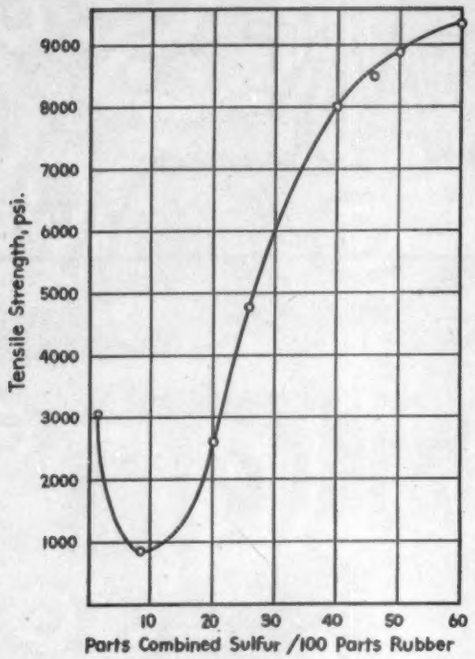

FIG. 1—Effect of combined sulfur on tensile strength.

parts of sulfur per 100 parts of polymer, but even this designation is subject to qualification. Two factors affect the final state of the compound, i.e., the sulfur ratio and the degree of vulcanization. For example, it is quite possible to cure two stocks, one containing 25 parts of sulfur and the other 45 parts, to the same state of cure, that is, possessing comparable physical properties. This is done by varying the time and temperature of vulcanization. In the industry itself, it is quite common to speak of a tank lining as being hard rubber when the physical properties might be 3000 psi tensile and 40% elongation and the material itself in a flexible condition. Thus, the terms "hard rubber" or "ebonite" are used to mean a high-sulfur rigid material and cured to a state approaching its maximum. For material in the flexible, semi-rigid condition, the term "semi-hard rubber" will be used.

In Fig. 1 the effect of combined sulfur on tensile strength is shown. The curve is an empirical one, drawn to show, in a general manner, what happens when the sulfur-rubber ratio is increased. A normal soft rubber compound is obtained with about 2 parts of sulfur. As the sulfur is increased to 8 to 10 parts, a degradation in physical properties occurs. With a further increase of sulfur to 20 to 25 parts a noticeable improvement in the tensile strength occurs and the stock has reached the semi-hard flexible state, at which point it is actually undercured hard rubber.

When the sulfur has been increased to 40 to 50 parts, the double bonds in the molecule have become totally saturated and the material has attained the true hard rubber or ebonite state. At this point the tensile curve reaches a flat "plateau" and further increments of sulfur do not improve the tensile strength due to the fact that the rubber molecule is fully saturated and, as has been pointed out, conforms to the empirical formula $(C_5H_8S)x$, containing 47% of combined sulfur.

Fig. 2 shows the relationship between time of cure and tensile strength. It will be seen from the curve that the incorporation of 2 parts of an accelerator reduces the curing time tremendously. It is important to note that, as shown in Table I, the physical properties are not reduced in any manner by this rapid type of cure.

Compounding Factors

Loading: The most common fillers used in the compounding of hard rubber are hard rubber dust, clay, whiting, wood flour, walnut shell flour, and silica. The reasons for using fillers are:

1. The cost of the compound is reduced.
2. Non-blowing cures can be obtained even on thick sections.
3. The shrinkage of the stock is greatly overcome.
4. Unloaded stocks cannot be molded satisfactorily without damaging the mold by molten sulfur.
5. Heavily loaded stocks possess greater dimensional stability, a very important factor in extrusion.

Of the fillers mentioned above, hard rubber dust is considered to be the most satisfactory for making a high grade, low gravity compound. However, since it is usually more expensive than the others mentioned, its use is not always economical. Whiting is a very good mineral filler, but it should not be used in applications where the compound is expected to have high acid resistance. Clays are also satisfactory except in that they dry up the stock, making it sometimes difficult to process. They also retard the cure considerably, especially if the stock contains reclaim. For compounds which must resist acid, the use of hard rubber dust or silica is recommended. Wood flour and walnut shell flour are good fillers in molded compounds which must have a low gravity. They both retard the cure slightly in all-rubber stocks but appear to have little effect when the compound contains reclaim. Carbon black does not reinforce hard rubber as it does soft rubber vulcanizates, and is seldom used as a filler. However, channel blacks of the

TABLE I—COMPARISON OF NON-ACCELERATED RUBBER-SULFUR STOCKS WITH ACCELERATED COMPOUNDS

Smoked Sheets	100	100	100
Sulfur	45	45	45
Process Oil	5	5	5
Thiuram Accelerator	...	2	...
Aldehyde-Amine Accelerator	...	...	2
Cure: 1 Hour @ 295° F. Open Steam			
Tensile (psi)	n.c.	8,700	7,120
Elongation (per cent)	n.c.	3.4	3.1
Hardness (Shore "D")	n.c.	87	82
Transverse Strength (psi)	n.c.	13,500	10,400
Softening Point (° C.)	n.c.	62	51
Impact (Izod)	n.c.	0.92	0.64
Cure: 3 Hours @ 295° F. Open Steam			
Tensile (psi)	n.c.	8,260	9,217
Elongation (per cent)	n.c.	3.07	4.1
Hardness (Shore "D")	n.c.	90	87
Transverse Strength (psi)	n.c.	14,600	14,290
Softening Point (° C.)	n.c.	64	71
Impact (Izod)	n.c.	0.86	0.81
Cure: 5 Hours @ 295° F. Open Steam			
Tensile (psi)	8,520	9,100	9,240
Elongation (per cent)	3.4	3.95	4.3
Hardness (Shore "D")	90	90	88
Transverse Strength (psi)	13,600	17,300	14,400
Softening Point (° C.)	62	63	69
Impact (Izod)	0.87	0.93	0.71

n.c. = no cure.

EPC type are often used as coloring agents when a deep black color is desired in a cheap stock.

Activators: Zinc oxide retards the vulcanization of hard rubber when it is present in any appreciable amount. It is useful, however, as a pigment in colored hard rubber stocks wherein the natural black color of the vulcanizate must be masked. Heavy calcined magnesia and lime are used as accelerator activators.

Acceleration: It is the practice of some manufacturers of hard rubber to cure their products over a relatively long period of time without taking advantage of organic accelerators. There are several reasons which are claimed for this practice:

1. The long cures fit in with production schedules.
2. The use of accelerators increases the difficulty of separating scrap and flash rubber.
3. The use of accelerators introduces the hazard of scorching.
4. Maximum physical properties are obtained with rubber and sulfur only, vulcanized in a long cure. Some manufacturers seem to feel that the addition of any unnecessary ingredients tends to lower the physical properties of the vulcanizate.

The first two reasons are questions which must be decided upon by the individual factory. The scorching hazard is recognized as a definite problem but with the proper precautions the damage can be held to a minimum. While it is true that maximum properties are obtained with rubber and sulfur only, as mentioned in reason 4 above, the use of organic accelerators does not in any way reduce these properties. This is shown in Table I.

The stock containing no accelerator was examined after one hour at 295°F. and no cure was evident. Even after three hours at 295°F., the stock was so undercured that its physical properties could not be measured. It is evident, then, that the incorporation of two parts of accelerator in the above base stock has reduced the curing time from five hours to 1 hour. It is important to observe that there has been no reduction in physical properties due to the accelerated cure. For all practical purposes, the properties of the two stocks are identical.

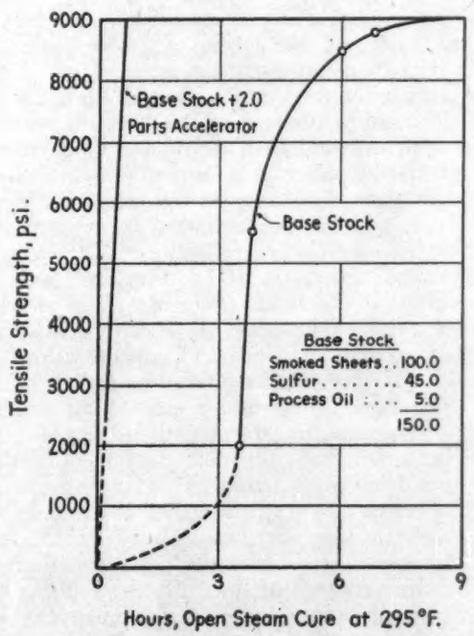

FIG. 2—Relationship between time of cure and tensile strength.

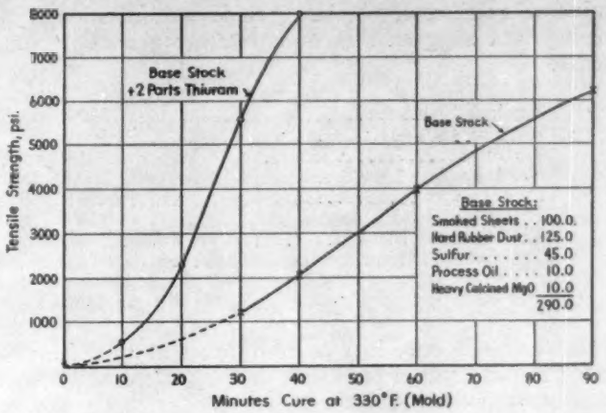

FIG. 3—Effect of thiuram accelerators on the rate of cure of a molded stock.

The acceleration of hard rubber vulcanization is essentially a means of reducing the curing time tremendously. It is our opinion that the time saved reflects great savings in power and labor costs; such savings are well worth the extra precautions necessary.

In general, the best accelerators for hard rubber are the guanidines, aldehyde-amines and thiurams. The guanidines are useful in curing thick sections of rubber where rapid acceleration is not necessary. Aldehyde-amine accelerators should not be used in clay stocks because they retard the cure. In the case of very thick articles, such as bowling balls, the advisability of using rapid acceleration is questionable. The exothermic heat generated in such articles is tremendous and ultra-accelerators only aggravate the condition, causing further porosity. For such applications, the use of mild accelerators, such as the guanidines, is suggested.

In Fig. 3 is shown the effect of thiuram accelerators on the rate of cure of a molded stock. It will be observed from the curves that a non-accelerated stock of the given composition requires 90 minutes to reach the 6000 psi tensile mark. The same stock, to which has been added 2 parts of accelerator, takes only about one-third the time (34 minutes) to reach the same state of cure. Translated into factory processing, this means that merely by adding 2 parts of accelerator, the production of such hard rubber can be increased threefold. As is apparent from the curves, the time differential at higher tensile strengths is much more pronounced.

Antioxidants: The use of antioxidants in hard rubber has been subjected to considerable discussion in the last few years and the present consensus of opinion is that their use is not necessary. This conclusion is due to the fact that most hard rubber articles are fully cured and are inherently resistant to oxidation due to the nature of the vulcanizate. However, some electrical manufacturers favor the use of antioxidants with the claim that a better surface is maintained, hence better electrical properties. A liberal quantity of antioxidant (3 to 4 parts/100 rubber) is recommended for stocks that are cured to the semi-hard rubber state, e.g., semi-hard tank linings and semi-hard roll stocks.

Specific Compounding

General Molded Goods: Some examples of hard rubber molded goods are pipe stems, knife handles, gun butts, trays, etc. These articles are normally made from stocks of medium quality which contain a considerable amount of filler. Since it is necessary that they be manufactured on a mass production scale, acceleration is a

universal method of obtaining rapid vulcanization. Following is a suggested formulation for general molded items:

Smoked Sheets	50.0
Reclaim (50% RHC)	100.0
Sulfur	45.0
Hard Rubber Dust	200.0
Process Oil	10.0
Heavy Calcined Magnesia	10.0
EPC Carbon Black	4.0
Tetramethyl-Thiuram-Monosulfide	4.0
	423.0

This stock will cure in 7 to 10 minutes at 330° F., provided the maximum thickness of the article in question is no greater than ½ inch.

There are primarily two reasons for using such a large amount of dust. First, it lowers the cost of the compound, and second, it reduces the shrinkage, producing a "dead" stock which will flow easily in the mold. Because of the high quantity of dust used, the molded article sometimes exhibits a gray color. For this reason the above formula contains a small amount of channel black which produces a dense black product. It might also be mentioned that since hard rubber dust has a comparatively low specific gravity, its use results in low gravity compounds which are very often desired.

Hard Rubber Acid Bottles: Acid bottles made from hard rubber are very often used for liquids containing hydrofluoric acid, such as etching solutions, frosting compounds, etc. A typical formulation for this type of compound is as follows:

Smoked Sheets	100.0
Reclaim	15.0
Hard Rubber Dust	50.0
Sulfur	45.0
Process Oil	10.0
Rosin Oil	10.0
Diphenylguanidine	1.0
	231.0

This stock will cure in one hour at 330° F. The rosin oil is used as a tackifying agent, to insure that the seams on the bottles are perfectly tight.

Hard Rubber Combs: Contrary to popular belief, hard rubber combs are usually not molded, but are die-pressed between sheets of highly polished tin and vulcanized. The warm rubber coming from the calender in the desired thickness is laminated between two sheets of tin. An automatic cutter cuts the sheets into suitable blanks which are then die-pressed while hot. After vulcanization the tin is easily stripped from the cured blank which then undergoes the further processes of grinding, teeth-sawing, and polishing. The following is a typical formula for a high grade comb:

Smoked Sheets	100.00
Sulfur	45.00
Beeswax	2.00
Linseed Oil	5.00
Accelerator (Aldehyde-Amine Type)	1.50
	153.50

This stock will cure in hot water in 2 hours at 295° F. Some unaccelerated combs are made, but they require a cure of 8 to 9 hours at 295° F. in water.

Tank and Pipe Linings: Hard rubber is used for tank and pipe linings because of its great resistance to chemicals. This property is taken advantage of in acid-carrying tanks and in acid-conveying pipes wherein the steel is lined with a hard rubber compound; hence, the acid or other chemical cannot attack the steel. The general practice in lining chemical equipment is to cut the sheets of uncured rubber to size, using skived edges on all seams, then cementing the rubber to the steel. Finally, the entire assembly is vulcanized, usually in open steam. For some services a soft rubber stock is veneered to the hard rubber stock on the calender and the rubber cemented to the tank with the soft rubber next to the steel. The soft rubber acts as a cushion and is of value in absorbing sudden shock; it also reduces strains due to the thermal expansion of the steel. Following is a formula which will make a representative tank lining:

Smoked Sheets	100.0
Reclaim	50.0
Hard Rubber Dust	100.0
Process Oil	10.0
Sulfur	40.0
Accelerator (Aldehyde-Amine Type)	3.0
Antioxidant (Neozone A used)	4.0
	307.0

Some tank and pipe linings are unaccelerated and the cure runs 7 to 8 hours at 284° F. Tank and pipe linings are generally not cured to the ebonite stage but rather are made in a semi-flexible condition, e.g., tensile of 4000 to 6000 psi and elongation of 20 to 40%, to ease the strain of expansion during service. The incorporation of a large amount of antioxidant will tend to reduce the oxidation and brittleness of the stock in service. It should be kept in mind that the degree of chemical resistance of hard rubber is a function of its state of cure, so that when resistance to chemicals is the prime objective, the stock should be cured to as hard a state as is permissible with other requisites.

The chemical resistance of hard rubber tank lining stocks is shown in Table II. The data given is intended as a rough guide only, since the specific conditions of service such as temperatures and concentration of the liquid make it impossible to guarantee the chemical resistance of a tank lining under any or all conditions. The solutions shown are at room temperature.

It will be noted from the table that the organic solvents show a deleterious action. This condition is due to the swelling action of these materials. It has been shown (Scott, *Rubber Chem. & Tech.*, Jan., 1938) that the amount of organic liquid absorbed is a function of the combined sulfur content of the vulcanized stock. Hence, the maximum resistance to organic liquids may be obtained by using an adequate amount of sulfur and curing to the maximum state consistent with the required physical properties.

TABLE II—CHEMICAL RESISTANCE OF HARD RUBBER LINING STOCKS

Solution	*Resistance of Hard Rubber*
Sulfuric Acid, 50%	Excellent
Hydrochloric Acid, Concentrated	Good
Glacial Acetic Acid	Fair
Phosphoric Acid, 85%	Excellent
Nitric Acid, 16° Be	Fair
Nitric Acid, 35° Be	Very poor
Water	Excellent
Sodium Hypochlorite, 16%	Good
Stannous Chloride, 15%	Good
Sodium Hydroxide, 20%	Excellent
Carbon Bisulfide	Very poor
Benzene	Very poor
Chlorobenzene	Poor
Carbon Tetrachloride	Poor

Hard Rubber Sheet: The manufacture of hard rubber sheet is a fairly large item in the industry; from such a material many articles are made. Sheets are made in various thicknesses ranging from 0.030-inch to 3 and 4 inches. The uncured rubber is plied up on the calender to the desired thickness, rolled between sheets of highly polished tin, and then vulcanized in open steam or hot water, usually the latter. A typical formulation for a hard rubber sheet is:

Smoked Sheets	100.0
Reclaim	30.0
Sulfur	50.0
Hard Rubber Dust	150.0
Process Oil	10.0
Tetramethyl-Thiuram-Monosulfide	3.0
	343.0

A ½-inch sheet of this stock will cure in one hour at 295° F. Without acceleration, the cure will require 6 to 7 hours at the same temperature. If heat resistance is required, the use of 10 to 20 parts of aluminum bronze or mica is recommended.

Rods and Tubes: From rods and tubes of hard rubber many articles are prepared. In order to be of value, the hard rubber stock must show two principal properties. First, the stock must be easily machined, and second, it must possess dimensional stability before cure. As a consequence of these requisites hard rubber rods and tubes are usually prepared from a heavily loaded nerve-free stock, such as the following:

Smoked Sheets	100.0
Reclaim	20.0
Sulfur	50.0
Hard Rubber Dust	200.0
Paraffin	10.0
Process Oil	20.0
Accelerator (Aldehyde-Amine Type)	4.0
	404.0

After extrusion through the appropriate die, the rods are placed in soapstone and vulcanized. The tubes are generally placed on mandrels to prevent collapse and then cured in soapstone. The purpose of the soapstone is to prevent staining or water damage by the wet steam.

Hard Rubber Battery Boxes: There are many types and grades of battery boxes, ranging from the poor quality asphaltic battery case to the very excellent hard rubber grade used in such applications as submarine service. Following are typical formulas for two grades of hard rubber cases:

	High Grade	*Low Grade*
Smoked Sheets	100.00	25.0
Reclaim	....	150.0
Sulfur	45.00	40.0
Hard Rubber Dust	50.00	75.0
Channel Black	....	4.0
Silica	....	100.0
Mineral Rubber	....	50.0
Lime	5.00	10.0
Process Oil	10.00	10.0
Accelerator (Aldehyde-Amine Type)	2.00	1.5
	212.00	465.5

These stocks will cure in 20 minutes at 330° F. when molded on a heated core. Some battery boxes are cured without acceleration for a long period of time, e.g., 8 to 10 hours at 287° F. in open steam. At the same temperature the addition of accelerator would reduce the time to approximately 3 hours. It should be emphasized that, since battery boxes are used in acid service, the choice of filler is very important. Whiting, a very excellent cheap filler for molded items, should not be used in battery cases because of its low resistance to acid. Silica and hard rubber dust are recommended as satisfactory fillers for this use.

TABLE III—PHYSICAL AND ELECTRICAL PROPERTIES OF HIGH GRADE HARD RUBBER

Color	Jet Black
Finish	High Lustre (When Polished)
Tensile Strength (psi)	8,000-10,000
Elongation at Break (%)	4-6
Specific Gravity	1.15-1.25
Heat Distortion (° C.)	55-65*
Transverse Strength	12,000-15,000
Dielectric Strength (volts/mil.)	50,000-60,000
Dielectric Constant (1000 cycles/5 volts)	2.8-3.0
Phase Difference (1000 cycles)	0.25°-0.30°

* Special stocks have heat distortion points of 120° to 130° C

Hard Rubber Sponge: Press-cured hard rubber sponge may be made by the same general method employed for press-cured soft sponge. The following compounds are recommended:

Smoked Sheets	100.0	100.0
Whiting	25.0	....
Sodium Bicarbonate	10.0	20.0
Stearic Acid	5.0	5.0
Mineral Rubber	10.0	50.0
Sulfur	40.0	60.0
Accelerator (Aldehyde-Amine Type)	1.0	1.0
	191.0	236.0

Half-inch slabs of sponge made from the above compounds will cure in 30 minutes at 90 pounds steam pressure (331° F.). The first compound, containing whiting, will average about 27 lbs./cu. ft. while the unloaded compound will average about 25 lbs./cu. ft. The rubber for hard sponge should be very highly plasticized in order to obtain the maximum blow.

Some of the physical and electrical properties of high grade hard rubber are shown in Table III.

Factory Processes

Mixing: The compounding of hard rubber compounds is quite similar to that of soft rubber, the main differences being in the sulfur ratio and in the use of hard rubber dust as a filler. The same equipment is used in fabricating hard rubber—mills, Banbury mixers, calenders, and extruders all being standard equipment.

A. BREAKDOWN OF ELASTOMER—It is of vital importance in the fabrication of hard rubber that the raw elastomer be well broken down before it passes to the mixing operation. This requirement is doubly important for the synthetic elastomers because they have considerably more "nerve" and show high shrinkage if not properly masticated. Natural rubber is more easily broken down and has much less "nerve".

Briefly, there are two methods of mastication. One is with the conventional mill; the other is with the Banbury mixer. Of these two methods, the Banbury mixer is to be preferred because of (1) its greater capacity and (2) the higher temperatures that are obtainable. It has been proven that a hot breakdown of elastomer is much more efficient than a cold breakdown.

B. INCORPORATION OF INGREDIENTS—The most common ingredients in a typical hard rubber compound are: elastomer, sulfur, fillers, plasticizers, activators (such as magnesium oxide or lime), colors and accelerators. Quite frequently reclaimed rubber is used in order to reduce costs and also as a processing aid. The order and meth-

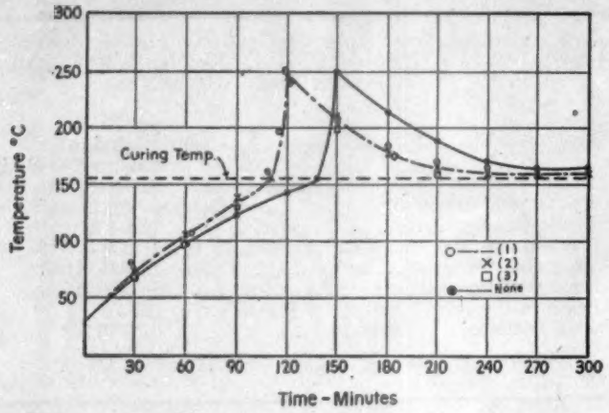

FIG. 4—Exothermic heats of various accelerators—2-inch specimens. (1) Tetramethyl-thiuram-monosulfide; (2) Piperidinium-pentamethylene-dithiocarbamate; (3)Aldehyde-amine type.

ods of addition of these materials are very important in obtaining a good dispersion. The rubber reclaim should be added directly to the masticated polymer either on a mill or in the Banbury mixer. This method insures a good dispersion of the rubber hydrocarbons before the other ingredients are added. It would be ideal if the other materials could be added separately too, but factory production schedules do not permit such a system. Therefore, the sulfur, filler, activator, plasticizer, and color are usually added together, all being uniformly stirred together by hand before addition. The mixing in of these ingredients is generally done on a cool mill in order to avoid any danger of scorching. It is important not to cut the rubber compounds on the rolls before the ingredients are all in, otherwise sulfur lumps are very likely to appear in the stock.

Accelerated stocks have to be treated very carefully in order to avoid scorching. There are several ways of handling these stocks:

1. Add the accelerator separately on a cold mill after all the other ingredients are in. When thoroughly mixed, cut the stock from the mill and place on refrigerated tables until cool. Be sure to sheet these stocks out—*do not roll up*. Other means of keeping the stock cool are (1) to pass the material through a cold water spray and (2) to dip the stock into a cold water bath.

2. Use accelerator masterbatches. This method is recommended for mixing accelerated stocks with a minimum of scorch damage. For stocks which may go through several processes, e.g., calendering, extrusion, molding, the accelerator masterbatch can be withheld from the stock until the warm-up for the final operation. Thus, the danger of scorch is kept to a minimum. The use of accelerator masterbatches also results in a better dispersion of the accelerator throughout the entire stock.

C. Storage—The storage of hard rubber batches can be carried out without much danger *if the stock is not accelerated*. In most cases, 24 hours' storage is recommended and it generally improves the quality of the finished product. This period of storage provides a resting period for the rubber compound which has so recently undergone terrific stress. Unaccelerated stocks can be rolled up and stored on racks until further use. Accelerated stocks *must not be rolled up;* rather, they should be sheeted out to cool.

Calendering: The calendering of hard rubber compounds is essentially no different from that of soft rubber. There may be variations in temperature, etc., but in general the methods are the same. For articles which are to be pressed and cured on tin, such as combs, trays, etc., the stock coming from the calender in the desired thickness is calendered directly on to the tin which is inserted underneath the rubber on the calender drum. A second sheet of tin is then rolled on to the top surface of the stock. Laminated structures, such as battery cases, are also made directly on the calender, the soft rubber laminate being calendered into the structure.

Molding: The molding of hard rubber articles is not a simple operation and various precautions must be taken in order to obtain a solid, non-porous product. The technique varies with the thickness of the piece to be molded—the thicker the piece, the more precautions one must observe. Most articles are molded from compounds which contain a large amount of hard rubber dust. The dust has the effect of "deadening" the stock and preventing excessive shrinkage. A stock containing rubber and sulfur only cannot be molded satisfactorily, because the sulfur will flow all over the mold, and the stock will exhibit high shrinkage. Other fillers may be used, of course, but hard rubber dust has proven to be most satisfactory. In order to avoid trapping air in the mold, it is customary to "bump" the press several times at the start of the cure, i.e., raise and lower the ram of the press, thus opening the mold and allowing any air to escape.

Exothermic Heat: Exothermic heat may be defined as the heat evolved by the chemical combination of sulfur with an elastomer during the process of vulcanization. This heat is liberated at an early stage in the reaction with a consequent evolution of hydrogen sulfide, indicating that substitution, dehydrogenation, or decomposition is occurring. The amount of exothermic heat generated is a function of two quantities, as will be evident from the accompanying curves: (1) The temperature of vulcanization, and (2) The thickness of the specimen. In this study of exothermic heat, a typical medium quality molded stock was used. Following is the base formula:

Smoked Sheets	100.0
Hard Rubber Dust	125.0
Sulfur	45.0
Process Oil	10.0
Heavy Calcined Magnesia	10.0
	290.0

The following accelerators were also tested, two parts of each being used: (1) Tetramethyl-thiuram-monosulfide, (2) Piperidinium-pentamethylene-dithiocarbamate, and (3) Aldehyde-amine type. The temperature readings were obtained by a recording potentiometer (made by Leeds and Northrup Co., Philadelphia, Pa.) with a range of 0 to 400° C. The thermocouples were of iron-constantan wires with the ends slightly fused.

It has been claimed that the use of organic accelerators in curing hard rubber results in a magnification of the exothermic heat. The results of the present study show that this is not true even with the fast accelerators we have used. What does happen is that the time of heat generation is advanced but the maximum temperature obtained is not affected. In Figure 4 the results show that the peak temperature is obtained at approximately 114 minutes for the accelerated stock whereas in the unaccelerated stock the peak is not reached for 150 minutes. It is interesting to note that the three accelerators under discussion showed no appreciable differences in either the "peak time" or in the degree of generated heat.

Figure 5 shows the relationship between curing temperature and exothermic heat on a non-accelerated stock. It is logical to assume that accelerated stocks would show the same characteristics. The results obtained in this study are in good agreement with those published by Winspear et al (Winspear, Herrmann, Malm and Kemp,

"Comparison of Natural and Synthetic Hard Rubbers," Bell Telephone System Monograph No. B-1393). Curing at 153° C. resulted in a peak temperature of 245° C. in 110 minutes, whereas at a curing temperature of 142° C. the peak temperature obtained was 209° C. at 190 minutes.

The effect of specimen thickness on the degree of exothermic heat is shown in Figure 6. As might be expected, the magnitude of the generated heat is a direct function of the thickness of the specimen. At two different curing temperatures, the curves obtained are quite similar in shape, the difference being only in magnitude. In the case of the stock cured at 153° C., the exothermic heat does not become too great until a thickness of one inch is used. When the curing temperature is reduced to 142° C., the effect of the generated heat is not too apparent until a thickness of one and one-quarter inches is reached. Hence, these heating curves are of practical value in determining the degree of exothermic heat generated by a given thickness of sample; the necessary precautions can then be taken to avoid porosity.

To avoid any possible misunderstanding, it should be pointed out that there is no direct correlation between these exothermic heat curves and the usual time-tensile curves. The great differences in rate of cure between accelerated and non-accelerated stocks shown in Figure 3 were obtained on specimens of ¼-inch thickness. On such a sample thickness, the effect of exothermic heat is negligible. In summation, it may be said that organic accelerators will greatly increase the rate of cure (especially on thicknesses under one inch) and the use of such accelerators will also increase the rate of generation of exothermic heat in samples of any thickness.

Extrusion: Extruded goods, like molded goods, must possess a similar degree of "deadness" or freedom from nerve. This condition is again arrived at by the addition of filler, usually hard rubber dust. The most common articles made by the extrusion process are rods and tubes of various dimensions and for many purposes. In most cases, the extruded products do not undergo any more processing until they are vulcanized. Consequently, they must possess high dimensional stability, and it is for this reason that "dead" stocks are necessary.

Vulcanization Processes: The vulcanization of hard rubber articles is quite similar to that of soft rubber, except in the length of the vulcanization period. The type of vulcanization used depends, as in soft rubber work, upon the type of article and upon the service to which it will be subjected. In general, there are three standard means of vulcanization, namely, open steam, water, and mold. These processes will be discussed separately and the type of compounds used in each will be shown.

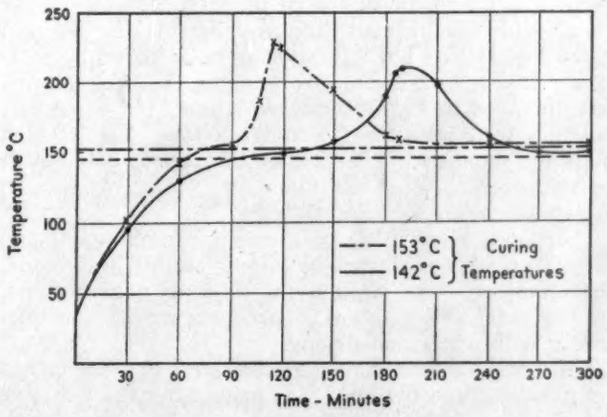

FIG. 5—Effect of curing temperature on exothermic heat (unaccelerated stock—½-inch specimen).

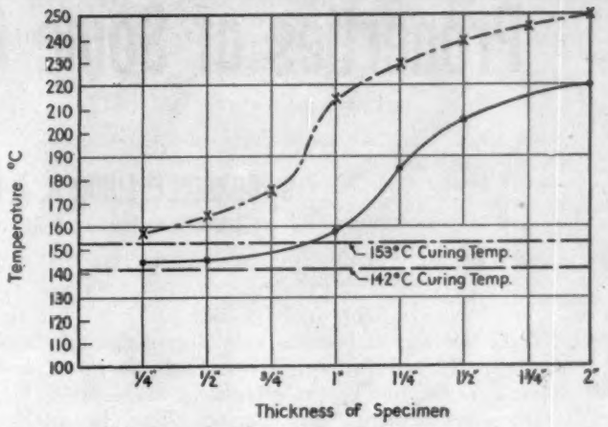

FIG. 6—Effect of specimen thickness on exothermic heat (unaccelerated stock).

A. Open-Steam Vulcanization—This type of cure is used primarily for products which do not necessarily require a lustrous surface. Some examples of hard rubber articles which are cured in this process are battery cases, tank linings, rods, and tubes. The articles to be cured are placed in the vulcanizer and steam is introduced to the desired temperature. In some cases the products are packed in talc or soapstone in order to protect them from the wet steam. Open steam cures generally have a cooling period after the cure is completed. The pressure is maintained by air while the steam is being withdrawn, thus precluding any blowing of the compound which might occur.

B. Water-Cure Process—The curing of ebonite by means of hot water is quite commonplace throughout the industry. The water is heated by means of steam to temperatures well above its boiling point (the pressure of the steam above the water prohibits the boiling of the water). It is customary to press out articles for this type of cure between tin before vulcanization. For example, combs, trays, and high-grade sheet material are pressed between sheets of highly polished tin. After cure, the tin is stripped from the stock, leaving a very desirable finish on the article, which can be buffed up to a high lustre. Articles which are not covered with tin may be vulcanized in hot water, but the water will cause considerable staining on the exposed surface and the cured material is liable to be spongy due to water absorption.

C. Mold Vulcanization—This method of curing is very extensively used and is the most efficient method of producing hard rubber goods in quantity. Typical products cured in the mold are pipe stems, magneto parts, syringes, hard rubber pails, etc. Because of the high initial cost of a mold, the products from that mold must be manufactured by mass production. Since the molding cycle must be kept to a minimum, the rubber compound must be capable of rapid vulcanization and that means one thing—acceleration. Practically all hard rubber products produced by mold vulcanization are accelerated.

One common variation of mold vulcanization is to partially cure or "set-cure" the article in the mold, remove it from the mold, and then finish the cure in a hot air vulcanizer or "jacket-heat." This method is used to speed up the production by decreasing the time that the rubber occupies in the mold.

Properties of Some Oil Resistant Adhesives

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DURING the war it became very apparent that there was a real need for adhesives which were oil and solvent resistant. Large quantities were used for many purposes during this period. The knowledge gained during this period is being used at the present time for many industrial uses. We feel that many uses of adhesives which we accept as routine were not possible a few years ago.

The need for oil resistant materials is greater today due to the development of many new synthetic materials and the greater usage of materials such as vinyl compounds. These present a challenge to the adhesive compounder since they require large amounts of plasticizers and consequently are very difficult to adhere with regular adhesives. Since the need for this type of adhesive is apparent we should like to report on some of the properties of oil resistant adhesives.

In our work we have found it possible to make oil resistant adhesives from a number of materials. We should like to confine this report to those we have made from neoprene, Buna N and Thiokol and plan to stress the type of adhesive which gains its strength due to a loss of solvent rather than those which require curing. In most cases, of course, curing will improve the bond strength and oil and solvent resistance.

In general, we have found that the oil resistant synthetics are more difficult to make into adhesives and that this property is more pronounced as the synthetic becomes more oil resistant. This probably stands to reason since as the base material becomes more oil resistant the solvents which can be used are fewer in number. The three synthetics we have used could be rated as follows: Neoprene makes adhesives nearest to natural rubber as far as working properties are concerned. Buna N is next in order and Thiokol is hardest to use. Each of the materials seems to have its own field of usefulness.

As is the case with most compounds we use today it is usually not possible to obtain one which is ideal. So we compromise and get the type of material which seems to give us the most of the properties which we are looking for. In nearly all cases these properties must be determined for each job.

Many types of compounds are being used as adhesives today. One of the most interesting combinations from the standpoint of oil resistance combines synthetic rubbery polymers with synthetic resins of the phenol formaldehyde type. Both neoprene and Buna N have been used in conjunction with this type of resin to obtain materials with good properties.

In order to study the effect of these combinations we have made comparisons of various ratios of resins to synthetic rubber. For this particular test we used Hycar OR-25 with two resins—Monsanto Resin No. 378 and Durez No. 11078. The adhesives were prepared by milling the Hycar OR-25 for five minutes. The rubber was then dissolved in methyl isobutyl ketone. The resin was also dissolved in methyl isobutyl ketone, keeping the solids the same as in the case of the rubber solution at approximately 20%. After this was done it was easy to prepare the ratios we were studying.

The bonds were made to a steel or aluminum plate. The steel plate was cleaned by wiping clean with acetone. The aluminum was cleaned by washing with acetone, treating with 20% solution of phosphoric acid, and then rinsing with water and drying.

The adhesive was coated to the steel at .008 inches wet thickness and the bond was made after the adhesive had developed tack. The bonded samples were conditioned sixteen hours at 122° F. or two hours at 212° F. In the case of non-vulcanizing adhesives the same results

Note: This paper was presented at the 53rd Meeting of the Division of Rubber Chemistry, A.C.S., Los Angeles, Calif., July 22-23, 1948.

TABLE I—VARIATION IN ADHESION TO STEEL WITH RESIN CONTENT.
(HYCAR OR-25-MONSANTO RESIN NO. 378).

Test specimen 1 inch x 8 inch white drill cloth stripped from steel at an angle of 180°. Scott Inclined Tensile Tester values in grams per inch width and lbs. per inch width.

Ratio Rubber to Resin	gms./inch (width)	lbs./inch (width)
Conditioned 16 hrs. @ 122° F.		
10-1	3800	8.3
4-1	4200	9.2
4-2	6200	13.6
4-3	6200	13.6
4-4	7100	15.6
4-5	8300	18.3
Conditioned 16 hrs. @ 122° F. and 7 days in kerosene @ 78-80° F.		
10-1	2200	4.8
4-1	3900	8.6
4-2	5800	12.8
4-3	6800	15.0
4-4	5700	12.5
4-5	5400	11.9

TABLE II—VARIATION OF ADHESION TO ALUMINUM WITH RESIN CONTENT.
(HYCAR OR-25-DUREZ NO. 11078).

Test specimen 1 inch x 8 inch white drill cloth stripped from steel at 180° F. Scott Inclined Tensile Tester values in grams per inch width and lbs. per inch width.

Ratio Rubber to Resin	gms./inch (width)	lbs./inch (width)
Conditioned 2 hrs. @ 212° F.		
10-1	3700	8.1
4-1	6400	14.1
4-4	7200	15.8

TABLE III—VARIOUS ADHESIVES BONDING PLASTICIZED POLYVINYL CHLORIDE

SHEAR TEST

Test specimen 1 inch bonded to aluminum; 1 square inch of bonded area; removed in shear on a Scott Tensile Tester at 2 inches per minute. Results in lbs./sq. in.

(A = Buna N; B = Reclaim-Rosin)

	48 hr. @ 78-80° F.	7 days @ 78-80° F.	7 days @ 160° F.
Polyvinyl Chloride Plasticized with Paraplex G-25			
A	62	72.5	142.5
B	41	59	75
Polyvinyl Chloride Plasticized with Dioctyl Sebacate			
A	53	83	270
B	88	11	2.5

will be obtained if the samples are dryed at room temperature for longer periods of time.

The bond strength was determined by reenforcing the cloth with a high strength pressure sensitive tape and stripping from the metal at an angle of 180° in a Scott inclined plane tensile tester. Values are in grams and lbs. per inch of width. The bonds were also soaked in kerosene and were tested after the soaking period.

By examining the results tabulated in Table I we see that as we increase the ratio of resin to rubber the value of the bonds increases. We would be led to believe this is correct since with a higher ratio of resin the adhesive would be firmer and would also tend to adhere to metal better. We also see that seven days in kerosene have only slight effect on this adhesive.

In Table II we have used the same rubber but a different resin and metal, namely, aluminum and Durez No. 11078. The conditioning time was two hours at 212° F. We see that the results to aluminum are also very good.

Much more work should be done on the effect of different solvents, and the range of materials to be adhered to should also be explored. Basic information of this type will be very helpful in compounding adhesives.

As we have already mentioned, one of the problems facing the adhesive compounder is the one of migrating plasticizers with many compounds in use today. In order to get a direct comparison of the results on adhesives we obtained identical polyvinyl chloride compounds, one of which was plasticized with Paraplex G-25 and the second with dioctyl sebacate.

These compounds were adhered to aluminum so that we had one square inch of bonded area, and were removed in shear on a Scott Tensile Tester at two inches per minute. The bonds were aged for forty-eight hours at 78 to 80° F., seven days at 78 to 80° F., and for seven days at 160° F. The results are tabulated in Table III.

From Table III it can be seen that while in the compound which has a non-migrating plasticizer even the reclaim-rosin adhesive shows good results. However, where the migrating plasticizer is used even at room temperature the reclaim-rosin shows a low value of 11 lbs. per square inch and after aging at 160° F. gives a value of only 2.5 lbs. per square inch. The high value obtained on seven days at 160° F. probably is due to better adhesion to the plastic film.

A similar test was run in which the testing was accomplished by stripping vinyl compound with no plasticizer, with a non-migrating plasticizer, and with a migrating

TABLE IV—ADHESION OF THREE VINYL COMPOUNDS TO ALUMINUM.

STRIP BACK TESTS

Test specimens 1 inch strips of vinyl-coated cloth bonded to aluminum strips 1 inch wide; samples stripped back at an angle of 180° on the Scott Tensile Tester; jaw separation 2 inches per minute; values in lbs. per inch width.

(A = Migrating Plasticizer; B = Non-Migrating Plasticizer; C = No Plasticizer)

Days conditioned	A	B	C
Buna N No. 1 Adhesive			
1	5	6	5
5 } 78-80° F.	8	7	9
14	8½	12	8
5	5½	7½	8
13 } 160° F.	6	7	8
Buna N No. 2 Adhesive			
1	3	4	3½
5 } 78-80° F.	7	4½	4
14	7½	5½	4
5	¼	10	7
13 } 160° F.	½	8	7
Neoprene Adhesive			
1	2	1	3½
5 } 78-80° F.	5	5	4
14	7	5½	4
5	2	5	7
13 } 160° F.	½	5	7

plasticizer from aluminum at an angle of 180° with a jaw separation of two inches per minute. The results are tabulated in Table IV.

Two Buna N adhesives and a neoprene adhesive were used. The bonds were conditioned as indicated and it can be seen that at 160° F. one of the Buna N adhesives has stood up well even on the compound with a migrating

TABLE V—ADHESION TO PLASTICIZED VINYL SHEETING.

DEAD LOAD STRIP BACK TESTS

Test specimens 1 inch x 8 inch strips of cloth-backed vinyl sheeting; dead load of 1 kilogram; one coat of adhesive on each surface; load applied 1 hour after bonding.

Bonding Times

A—10 mins.—Neoprene (Solvent)
B— 3 mins.—Buna N (Solvent)
C—30 mins.—Buna N (Water)
D— 8 mins.—GR-S (Solvent)

Time (min.-hrs.)	Distance Stripped (inches) A	B	C	D
5 mins.	1	1	1/16	4
10 mins.	2	2	1/16	Down *
15 mins.	3¼	2¼	⅛	.....
20 mins.	3¾	2¼	⅛	.....
30 mins.	5	2¼	¼	.....
1 hour	Down	2¼	⅜	.....
2 hours	.....	2¼	¾	.....
3 hours	.....	2½	1	.....
4 hours	.....	2⅝	1¼	.....
5 hours	.....	2¾	.....	.....
24 hours	.....	Down	4½	.....
48 hours	.....	.....	5½	.....

* Down in 8 minutes.

plasticizer. The second Buna N adhesive and the neoprene adhesive while good in the case of the compounds with no plasticizer and with a non-migrating plasticizer do go down in value at 160° F. with the compound which has a migrating plasticizer.

We have also made a comparison of adhesives by bonding two strips of vinyl sheeting cloth backed to itself. A dead load of one kilogram is suspended on the bond, the load being applied one hour after the bond is made. The results are tabulated in Table V.

Four adhesives are compared and it can be seen that the adhesive made from GR-S strips down very quickly. The neoprene adhesive is much better. The interesting adhesives are B and C both being Buna N but B is solvent dispersed while C is water dispersed. This indicates that the adhesives are strong enough to hold 1 kilogram after the solvent is evaporated but that very soon the plasticizer attacks the adhesive and causes further stripping.

This type of test, while very severe, is interesting since we feel that a good many adhesive failures are caused by an action very similar to the one which is present in this test.

A further test was run in which the comparison was made of three adhesives in 813 fuel. The sample bonds were made up by adhering eight oz. canvas to steel and were tested by stripping from the steel at an angle of 180°. The results are tabulated in Table VI.

It can be seen that a heating cycle does give some improvement in the strengths. It also is apparent that immersion in water is quite detrimental to the bonds. The Buna N adhesive gives a fairly good account of itself. We would not expect neoprene adhesive of the air drying type to be very good in aromatic fuel. The Thiokol adhesive contains resins which are somewhat soluble in aromatics, which accounts for the loss in strength.

One particular place where this information has been used is adhering weatherstrip to automobile doors. Due to changes in compounding procedure it is more difficult to adhere this type of material. By using a neoprene-base adhesive both the application characteristics and physical properties necessary to do a good job were obtained. Although the cost of the adhesive was greater than those formerly used, economies in application and much lower incidence of failure of the adhesive made the use of this type of adhesive successful.

TABLE VI—COMPARISON OF RESISTANCE OF THREE ADHESIVES TO 813 FUEL.
STRIP BACK TEST

Test specimen 1 inch 8 oz. canvas to steel; samples stripped back at an angle of 180° on the Scott Tensile Tester; jaw separation 2 inches per minute; values in lbs. per inch width.

Samples Conditioned	Neoprene	Buna N	Thiokol
Dried 10 days at 80° F.	41	23	8
Dried 10 days at 80° F. Plus 1 hour at 250° F.	55	63	12.5
Dried 10 days at 80° F. Plus 7 days in H_2O at 80° F.	No Adhesion	16	7.5
Dried 10 days at 80° F. Plus 24 hours in 813 Fuel @ 80° F.	Adhesive Soft	31	5.5
Dried 10 days at 80° F. Plus 10 days in 813 Fuel @ 80° F.	....	27	3.5

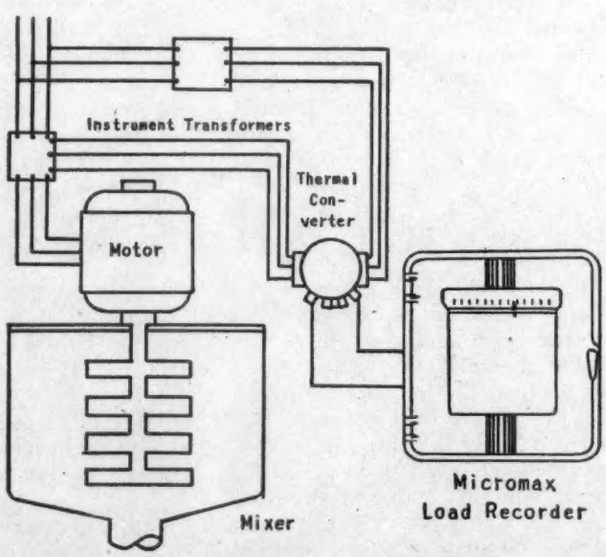
Indirect Measurement of the Viscosity of Materials in Mixers

VISCOSITY of materials in mixing or other types of agitating machinery can often be measured indirectly by measuring the power input to the electrical motor which drives the mixer. In many processes of this type, the materials must be mixed to a given viscosity, or until a definite reaction end point is reached where viscosity undergoes an abrupt change. By experience, viscosity can be related directly to motor input in kilowatts.

For such applications, the Micromax instruments featured by the Leeds & Northrup Co., 4934 Stenton Ave., Philadelphia 44, Penna., are being used in a number of plants. Method of installation is straightforward. A thermal converter is connected in the power leads to the drive motor, and converter output is wired to a potentiometer-type Micromax Load Recorder (See accompanying illustration). The instrument continuously records motor input in kilowatts or on some arbitrary scale supplied by the user.

When so desired, the Micromax is equipped to operate alarms on signal lights which inform the machine operator when the end point is reached. For some proceses, the Micromax can be supplied to provide automatic control, generally by regulating feed of process material. Where several machines are operating in one shop, data from all of them can be recorded on a single Micromax multiple-point instrument.

Micromax instruments used for this application are thoroughly standard equipment of the same basic type that power plants have used for years for both local and remote measurements of electrical load. The thermal converter, although amply fast-responding to show significant variations, smooths out the usual erratic variations in motor load and shows a true average which permits accurate analysis of trends. Because the potentiometer method is used for measurement, distance between thermal converter and the Micromax recorder has no effect on accuracy of measurements.



Method of installing Micromax Load Recorder.

Electric Drive Characteristics for Rubber Processing Machines

By A. T. BACHELER

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MACHINERY electrification in the rubber industry has progressed to the stage where nearly all processing machines are individually driven. With this advancement has come the problem of selecting the type of motor and control best suited for each processing machine. Since this choice largely determines production efficiency of the driven machine, it would seem advisable to discuss (1) the drive characteristics of the various processing machines—Banbury mixers, mills, plasticators, extruders, tubers and calenders; (2) the drive characteristics of the different types of motors available—synchronous, induction, direct-current; and (3) to relate these characteristics.

Banbury Mixers

The Banbury mixer is an enclosed batch type mixing machine having specially shaped rolls for mixing and kneading the rubber compound into a homogeneous state. Banburys have been provided with either a single-speed or a two-speed drive, the latter being desirable where the heating characteristics of some of the synthetic rubber compounds are involved.

Single-speed drives are best provided by synchronous or induction motors. For the synchronous motor drive, torque requirements are 125 percent starting, 100 percent pull-in, and 250 percent pull-out. Induction motors provide similar starting and pull-out characteristics. High starting torque is needed as the Banbury may have to be started while loaded. The high pull-out torque is necessary to provide the margin to carry peak loads which occur during the normal masticating and mixing cycle. Full voltage starting is desirable in order to obtain ample starting torque with either the synchronous or induction motor, although reduced voltage starters have been supplied. Where power supply limitations prevent full voltage starting, a wound-rotor induction motor can be used to provide good starting torque with low inrush current.

The two-speed drive for Banbury mixers can be obtained by any one of the five following methods:

1. Two-speed synchronous motor with single-winding armature providing a 2 to 1 ratio of speeds.
2. Two-speed single-winding induction motor providing a 2 to 1 ratio of speeds.
3. Two-speed double-winding induction motor providing a ratio of speeds other than 2 to 1, such as 3 to 2 or 4 to 3.
4. Single-speed motor with two-speed gear unit providing speeds in the desired ratio.
5. Two-speed synchronous motor with double stator and rotor structure, providing a ratio of speeds other than 2 to 1.

Note: This article is based on a paper presented by the author at the Conference on Electrical Engineering Problems in the Rubber Industry held by the American Institute of Electrical Engineers at Akron, Ohio, on April 20, 1948.

The two-speed synchronous or induction motor provides a flexible drive that allows changing speeds without stopping the Banbury. Reduced starting KVA with full starting torque is obtained by full voltage starting on the slow speed winding or connection. Full starting torque is maintained by the full voltage starting at low speed, and accelerating losses are reduced to approximately half that required with a single-speed drive.

The single-speed motor with two speed gear makes a simple and economical drive, although it is necessary to stop to change speeds. Where this is not required frequently, it is not regarded as a limitation. An advantage of the two-speed gear is that at the low-speed setting the gear ratio is greater and therefore there is extra torque capacity available from the drive.

Where Banburys require a two-speed motor drive, the torque capacities of the drive supplied are the same at both speeds. For instance, a No. 11 Banbury is supplied with a motor rated 500 hp at 900 rpm and 250 hp at 450 rpm.

Provision is made for reverse operation of the Banbury for adjustments or to start after a jam. In the case of the two-speed drive, reversing is needed only at low speed.

Plasticators

The drive requirements for a plasticator are similar to those of the Banbury mixer as it is an internal screw type machine that operates at constant speed and has a fairly steady load for any given condition of rubber.

A synchronous or induction motor of approximately 700 hp at 600 or 720 rpm is typical for plasticators. Since the load is quite steady after the drive is up to speed, high pull-out torque is not necessary. 250 percent pull-out torque and about 100 percent pull-in torque are adequate. High starting torque is needed to permit starting with the machine loaded and about 125 percent to 150 percent starting torque is provided. As with the Banbury mixer, reversing is required to assist in starting under unusually heavy load conditions.

Full voltage starting is needed to obtain the necessary starting torque. Where the power system is limited in capacity, a wound-rotor induction motor can be used to good advantage.

Mills and Mill Lines

Individual mills, as well as mill lines, require a constant speed drive having high starting and pull-out torques. A pull-out torque of 250 percent of full load torque is supplied in order to handle peak loads that normally develop in the mixing and warming of rubber in preparation for the calender or extruder. A starting torque of at least 125 percent is supplied in order to permit starting under loaded conditions. If the mill should

FIG. 1—Newly designed synchronous motor field coil for rubber mill use.

stop at a time when handling a peak load, then it is sometimes not possible to restart until the drive has been backed up a bit by reversing the motor. Emergency stopping must be provided as the mill is an open machine with exposed rolls.

These three requirements are met by the synchronous motor drive with full voltage starting. A quick stop is obtained by dynamic braking in which the armature of the motor is disconnected from the a-c supply and immediately connected to a braking resistor by a spring closed contactor or circuit breaker. The dynamic braking action is improved by over-exciting the motor field during the braking period so as to increase the generated voltage and therefore the braking current. In addition to high starting and pull-out torques, the rubber mill motor requires 100 percent pull-in torque to synchronize under loaded conditions.

As in the case of the Banbury mixer, reversing is required to restart under condition of unusually heavy load, although the drive will usually have sufficient torque to start without first reversing. Full voltage starting is desirable to maintain adequate starting torque but where power supply limitations prevent this, reduced voltage starters are sometimes used.

Wound-rotor induction motors are sometimes applied to mill line drives. Adequate starting torque is obtained with lowest inrush current by control of the starting resistance.

Where wound-rotor induction motors are used for driving mills, there are two electrical methods of obtaining braking for safety stops. The more common method is to plug the motor by reversing the primary excitation. Sufficient secondary resistance is placed in the rotor circuit to provide strong plugging torque. A zero speed switch on the motor shaft serves to cut off the power when the motor is stopped so that it will not come up to speed in the reverse direction. This form of braking has limitations in that it depends on the availability of a-c power and on the operation of a magnet closed contactor, both to apply and remove plugging power, and on a zero speed switch, which if not properly adjusted may permit the rolls to coast or possibly to reverse.

Dynamic braking may be used for safety stopping of a wound-rotor motor where a source of direct current is available. The d-c power is applied to the stator winding of the motor which sets up a stationary field. At the same time resistance is inserted in the secondary or rotor circuit. The dynamic braking action obtained is similar to that provided by the synchronous motor drive. This method of braking a wound-rotor motor eliminates the possibility of reversing or coasting but is dependent upon the d-c supply and proper operation of a magnet closed contactor.

Motor Construction for A-C Drives

Among the recent developments in a-c drive equipment for rubber machinery are the special rubber mill type field coil for synchronous motors, and the totally enclosed fan-cooled copper fin construction for synchronous, squirrel cage, or wound-rotor motors.

The special field coil construction for synchronous motors was developed to meet conditions arising from the use of carbon black in very finely divided form for synthetic rubbers. This very fine carbon black worked into the inside of the field coils and being about 100 times more conducting than previous forms, it soon caused failure to ground.

The newly designed field coil features thorough ground insulation all around the coil and leads. Figure 1 shows a completed field coil before assembly on the pole.

The construction of the coil is shown in Figure 2 which is a cutaway view of one of the field poles and coil. In the construction of the coil, the conventional pole cell is replaced by the ground insulation. After winding the coil, all crevices and corners are filled with cement to eliminate air pockets and the coil is then wrapped with layers of glass tape and mica tape. Between each layer of tape a coat of Bakelite varnish is brushed on and after the final layer, a coat of red enamel is applied. In the insulating of the coil, the coil leads are thoroughly tied in by the ground insulation tape. After assembly and brazing of coil leads are completed, the leads themselves are thoroughly insulated. Class B insulation is used throughout in the insulation of these coils.

This construction is now standard for all synchronous motors for Banbury mixers, plasticators, mill lines, individual mills, or other machines in locations where carbon black is in the air. Experience to date with motors using these coils has been excellent. Their service record is much better than that for motors using the conventional type of field coil.

The totally enclosed fan-cooled motor is coming into greater demand for a-c drives in the rubber industry. Development of the copper fin type of construction has

FIG. 2—Cut-away view of newly designed synchronous motor field coil.

materially reduced the necessary size of the fan-cooled motor by improving the efficiency of heat transfer.

Figure 3 is a cut-away view showing the construction of a typical totally-enclosed fan-cooled motor with copper fins built into the stator. Cooling of the motor is greatly facilitated by the copper fins that are built right into the stator core and that project outward radially beyond the core as shown in Figure 4. External cooling air, supplied by a blower on the motor shaft, passes around the circumference of the stator and picks up heat from the copper fins. The fins provide very effective cooling of the stator as copper is such an excellent conductor of heat.

The internal air is cooled by copper fins built up as part of the end cylinders. The externally projecting part of these fins is cooled by the same air that cools the stator core. In the motor shown in Figure 3 the external cooling air exhausts through the screens in the sides of the motor. On larger motors the air is vented at a greater number of locations around the frame.

The particular advantages of the enclosed motor are cleanliness, freedom from accumulations of carbon black, and reduced maintenance due to eliminating the entrance of dirt. A particular advantage of the copper fin construction is reduction in size of the enclosed motor. Up to approximately 500 hp at 900 rpm the copper fin motor is built in the same frame size as the open machine of the same rating. Class B insulation is used to help keep the size down. The overall outside dimensions are, however, somewhat larger due to the introduction of extra fans and air ducts.

Extruders and Tubers

While similar in general mechanical construction to a plasticator, the tuber or extruder is fitted with a die head having a hole of cross section corresponding to the shape of the product to be extruded. The extruded product, such as tread or tube stock, is usually cooled on a series of conveyors. In the case of rubber covered wire it may be vulcanized in a steam heated chamber. The speed of the tuber is partly dependent on how fast the product can be handled in the subsequent processing equipment.

An adjustable-speed drive is therefore required for most tubers and extruders. Most of the tubers and extruders in service are driven by adjustable-speed d-c motors operating from the single voltage or dual voltage d-c plant supply. A total production speed range of 4 to 1 by field control on the motor is typical for the single voltage system while a speed range of 2 to 1 by field control is typical for the 115/230 volt dual voltage system.

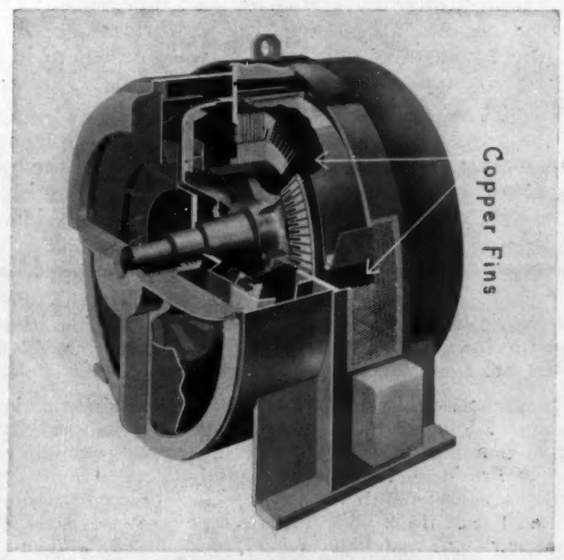


FIG. 3—Cut-away view of totally-enclosed, fan-cooled motor with copper fin construction.

FIG. 4—Stator core for totally-enclosed, fan-cooled motor with copper fin construction. Engineer is resting his right hand on the projecting copper fins and pointing to a single copper fin with the index finger of his left hand.

While tubers and extruders are usually considered to have essentially constant torque requirements for a given grade of stock, the constant voltage drives provide greater torque capacity at slow speed than at high speed. Where an adjustable-speed motor is used on a constant voltage system, constant horsepower is available.

Where only a-c power is available, as in many of the more recently built plants, the adjustable-voltage d-c drive offers an excellent solution to the drive problem. The adjustable-voltage drive permits a much wider speed range with equipment of reasonable size than the previous standard constant voltage drive.

With the adjustable-voltage d-c drive, the motor usually has a 2 to 1 range of speed by field control, which gives greater margin at low speed than would a motor whose speed range is obtained only by armature voltage control. This is desirable since the actual torque required to extrude rubber will tend to be greater for a small die head opening than with a large opening.

Operation in range with auxiliary drives such as conveyors, capstans or winders is improved by using adjustable-voltage control of the extruder and auxiliary motor speeds. One of the important advantages is the ease with which smooth acceleration from rest to operating speed can be obtained by gradually raising the armature voltage applied to the motors.

An example of a modern adjustable voltage drive is shown in Figure 5 illustrating the mechanical arrangement and circuit diagram for a wire insulating machine. Wire coming from the reel passes through an extruder where a coating of rubber is deposited. After passing through the vulcanizing chamber the wire passes around a capstan which actually sets the wire speed. From the capstan the wire goes to the take-up where it is wound on a spool. The insulation testing section is not shown.

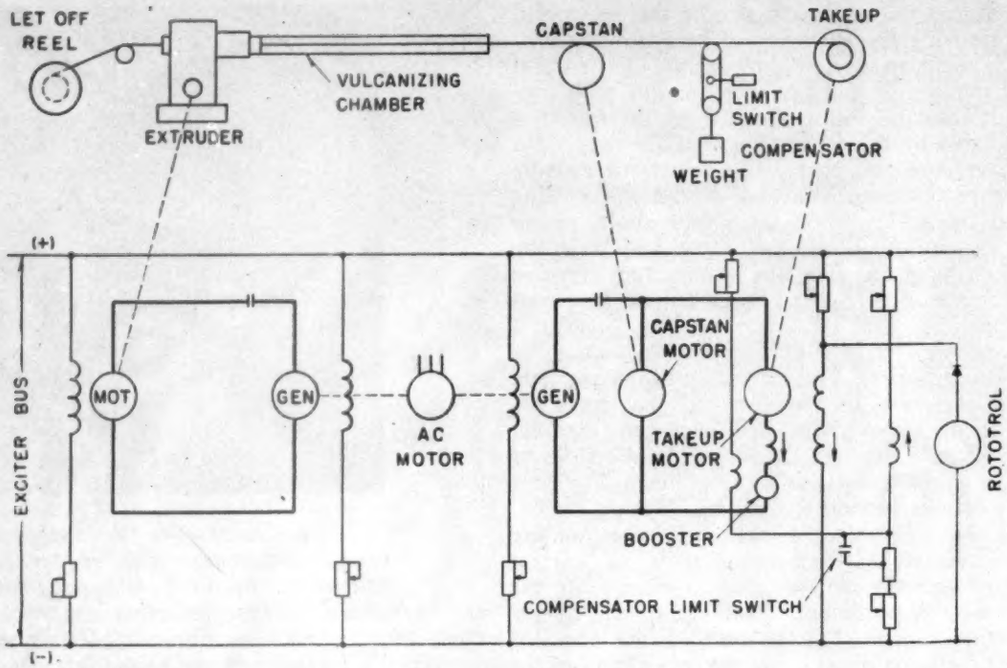


FIG. 5—Schematic diagram for a wire insulating machine driven by an adjustable-voltage d-c drive.

The extruder motor runs over a wide speed range by a combination of motor field and armature voltage control. The capstan and take-up are driven by individual motors receiving power from a separate generator, which makes a very flexible drive. The take-up reel is core driven by an adjustable-speed motor whose load current is regulated for a constant value by a Rototrol rotating regulator in order to hold essentially constant tension in the wire. A booster generator in series with the take-up motor compensates for IR drop and provides forcing action during reel change. In this particular drive an automatic transfer from a full reel to an empty reel was required without a change in production speed.

The take-up stand is of the double reel type and as soon as the wire is transferred from the full reel to the empty reel, the drive must immediately accelerate to empty reel speed. As soon as a few wraps are made on the new reel the wire from the full reel is cut. The slack introduced during the acceleration is taken up by a small weighted compensator and a limit switch operated by the compensator initiates forcing action to speed up the reel. Under normal conditions the compensator is pulled up tight against the upper stop.

Calenders

Calenders are open roll type machines of either three or four roll construction. A few special calenders such as those for embossing duty are built with but two rolls.

An adjustable-speed drive is required and until recently the standard dual voltage d-c drive using a motor with a 2 to 1 speed range by field control has been supplied in most cases. Where only a single voltage d-c system is available an adjustable-speed motor having a speed range of 3, 4, or 5 to 1 has been used. A threading speed of about ⅛ the top speed is provided by armature resistance control.

The torque requirements of calenders tend to be somewhat greater at slow speed operating conditions than at top speed. Adjustable-speed motors provide the desired increased torque capacity at reduced speed, although the motor with a 2 to 1 speed range by field control operating on a dual voltage system provides adequate margin.

Adjustable-voltage drives for calenders are now well standardized. It is customary to provide a total operating speed range of 8 or 10 to 1, of which not more than 2 to 1 and sometimes less is obtained by motor field control. A very low stable speed is obtained for threading purposes by operating the motor at full field and low armature voltage.

Due to the hazard of exposed rolls, the calender drive must provide emergency stopping in a minimum of roll travel. Dynamic braking is supplied on constant voltage drives and either dynamic or regenerative braking on adjustable voltage drives. From the standpoint of emergency stopping the motors with the least speed range by field control offer the advantage of a quicker stop. This is true because the motor with higher base speed and less field control is physically smaller and there is less inertia to stop, while the braking torque capacity is about the same.

The adjustable voltage drive, by providing regenerative braking, permits a still shorter stop since the braking rate is maintained to a much lower speed than is possible with conventional single step dynamic braking.

Intelligent International Investment. United States Council of the International Chamber of Commerce, Inc., 18 East 41st St., New York 17, N. Y. 6 x 9 in. 20 pp.

This report of the Committee on Business Participation in Foreign Economic Development of the International Chamber of Commerce presents a program for implementing point four of President Truman's inaugural address. Some of the subjects considered in the report include a discussion of United States trade policy, matters of taxation, government loans, strategic materials and technical missions. The position of the United States Council on the question of international investment is also elaborated upon, with recommendations as to future action by government and industry.

An Acceleration Study Using Reinforcing Furnace Blacks in Natural Rubber Treads

By W. H. HEINLEN, Jr.

B. F. Goodrich Chemical Co., Cleveland, Ohio

Reinforcing furnace blacks as replacements for channel blacks in natural rubber tread formulations are receiving increased interest throughout the industry. The major difficulty encountered in their use has been a definite processing scorch problem introduced by their inherent high pH and consequent low accelerator adsorption values. Reduction of common accelerators and/or sulfur loadings to various degrees of starvation improves scorch resistance to some extent, but only at the expense of hysteresis, set, and other important properties in the vulcanizates.

Further expansion in the use of these furnace blacks is justified by the data of this study in which mixed aliphatic thiazyl disulfides are used for acceleration in combination with n-nitroso diphenyl amine for retardation. With this accelerator combination, adequate freedom from scorch is achieved without detriment to other important physical properties in the vulcanizate. The effect of a concentration range of both sulfur and retarder is shown and comparisons are made with a standard E.P.C. tread stock used as a control. The R. F. black vulcanizates are shown, by all physical tests, equal to and in many ways superior to the similarly loaded E.P.C. black control stock.

THE introduction of reinforcing furnace blacks has given the rubber compounder a reinforcing pigment with improved processing properties, a new type of carbon structure *(1)*, and a potential economic advantage. However, a fundamental scorch problem is encountered when the reinforcing furnace blacks are used in rubber compounds as direct replacements for channel blacks *(2)*. In view of the increasing trend toward the use of these blacks in natural rubber tread formulations, the B. F. Goodrich Chemical Company has investigated several of its current production rubber chemicals from the standpoint of solving this scorch problem.

It is generally recognized that the reinforcing furnace blanks, hereafter referred to as R. F. blacks, have high pH values with low accelerator adsorption properties when compared to channel blacks. This latter quality accounts for the processing scorch problems when common accelerators are used at normal concentrations. If accelerator-sulfur ratios are reduced to various degrees of starvation, scorching characteristics are improved to some extent, but only at the expense of hysteresis, set, and the aging properties of the vulcanizates.

With these conditions in mind, a mixed aliphatic thiazyl disulfide, which is an excellent delayed action accelerator, and *n*-nitroso diphenyl amine, a very effective retarder at processing temperatures, have been successfully used in developing a tread formulation which is of considerable interest. Adequate freedom from scorch has been achieved and the inherent advantages obtained with the R. F. blacks can now be realized without detriment to other important compound properties. Comparisons are made with an E.P.C. black loaded tread compound also accelerated with the mixed aliphatic thiazyl disulfide. This formulation is used as a control in the study and is similar to one which has been used successfully in production.

Before discussing these data, the materials used should be further identified. The mixed thiazyl disulfide used throughout the study is commercially known as Good-rite Erie, and is the new pelletized form of this accelerator. It contains 50% active agent by weight and is a free-flowing, dustless, chemically stable product with good storage and handling characteristics. Good-rite Vultrol is the commercial name for the retarder *n*-nitroso diphenylamine.

The basic recipes for the R. F. black and the E.P.C. black loaded tread compounds are shown in Table I. The basic R. F. black loaded recipe was used throughout the study with varied sulfur and retarder concentrations. A compounding variation, contrary to some theories for this type of stock, is evidenced by the use of 3.0 parts of stearic acid. This relatively high concentration of acid is desirable for best hysteresis properties.

In preliminary development work, not discussed at this time, 1.2 and 1.6 parts of Good-rite Erie were determined as optimum for the respective R. F. and E.P.C. black loaded compounds. These accelerator concentrations are recommended and were used in all of the formulations presented in this discussion.

TABLE I—BASIC RECIPES

R. F. Black Formulation

No. 1 Smoked Sheet	100.0
Zinc Oxide	5.0
R. F. Black (Statex K)	50.0
Stearic Acid	3.0
Agerite H.P.	1.0
Pine Tar	2.0
Sulfur	Variable
Good-rite Vultrol	Variable
Good-rite Erie	1.2

E.P.C. Black Formulation (Control)

No. 1 Smoked Sheet	100.0
Zinc Oxide	5.0
E.P.C. Black (Wyex)	50.0
Stearic Acid	2.5
Paraflux	3.0
Agerite H.P.	1.0
Sulfur	3.0
Good-rite Erie	1.6

Note: This paper was presented before the Division of Rubber Chemistry, A.C.S., Detroit, Mich., November 8, 1948.

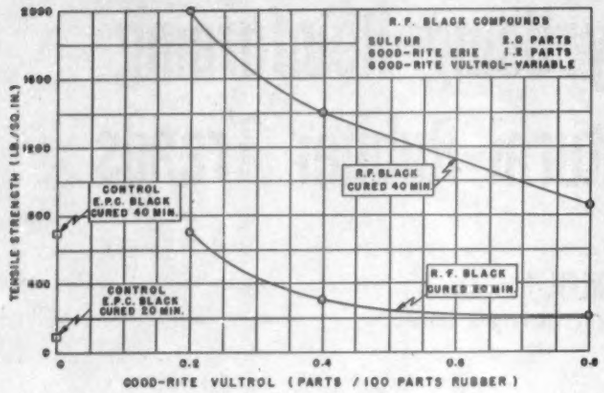

R. F. BLACK COMPOUNDS
SULFUR 2.0 PARTS
GOOD-RITE ERIE 1.2 PARTS
GOOD-RITE VULTROL- VARIABLE
TENSILE STRENGTH (LB./SQ. IN.)
CONTROL E.P.C. BLACK CURED 40 MIN.
CONTROL E.P.C. BLACK CURED 20 MIN.
R.F. BLACK CURED 40 MIN.
R. F. BLACK CURED 20 MIN.
GOOD-RITE VULTROL (PARTS / 100 PARTS RUBBER)

FIG. 1—Scorch tensile strength of stocks containing R. F. Black and Good-rite Erie (cured at 240°F.).

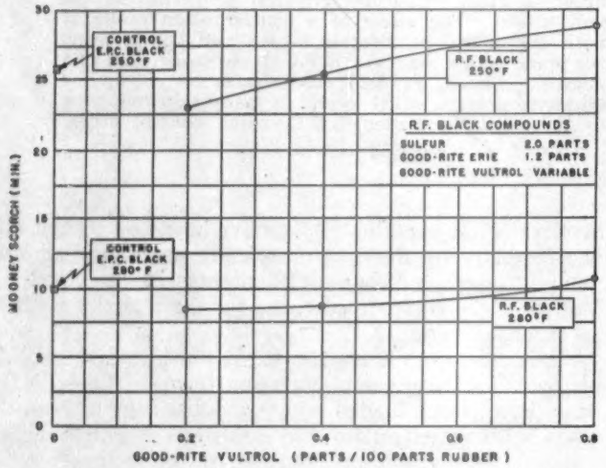


FIG. 2—Mooney scorch of stocks containing R. F. black and Good-rite Erie.

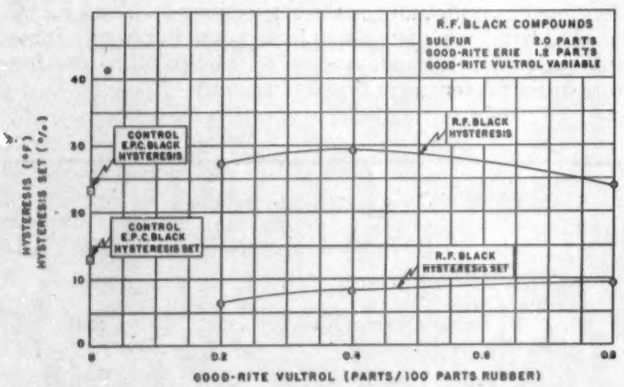


FIG. 3—Hysteresis and hysteresis set at 212°F. of stocks containing R. F. black and Good-rite Erie (55 lb. load, 17.5% stroke).

It should also be stated that Statex K was the R. F. black used in this study. However, more recent laboratory data indicate that Good-rite Erie and Good-rite Vultrol are equally effective for all of the currently available R. F. types of black.

In the series of four graphs shown in Figures 1, 2, 3 and 4, a sulfur content of 2.0 parts was chosen so that the effect of a concentration range of Good-rite Vultrol on pertinent physical properties of the R. F. black loaded vulcanizates could be studied. Scorch tensile properties are graphically shown in Figure 1. It is evident that the Good-rite Vultrol has reduced scorch tensiles and that 0.8 parts produces a vulcanizate comparable to the E.P.C. control.

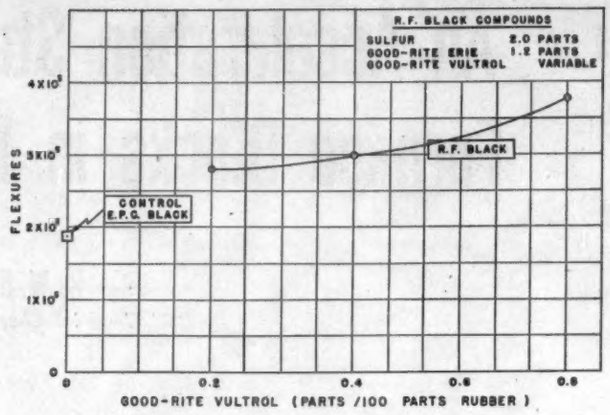


FIG. 4—De Mattia flexing to rating (8) of stocks containing R. F. black and Good-rite Erie.

In Figure 2, Mooney scorch data at 250 and 280°F. are graphed. Here again 0.8 parts of Good-rite Vultrol is shown to improve materially scorch resistance at 250°F. and while the improvement is not as pronounced at 280°F., it is equivalent to the E.P.C. control. On the basis of these laboratory data, it is believed that adequate freedom from scorch is indicated for normal processing procedures.

Hysteresis properties which are of special interest in tread types of vulcanizates are graphically shown in Figure 3. The R. F. black vulcanizate, containing 0.8 of Good-rite Vultrol, gives a 24 degree temperature rise as compared to 23 degrees for the E.P.C. control. This test was run at an original temperature of 212°F. with a 55 pound load and 17.5% stroke on the Goodrich Flexometer *(3)*.

DeMattia flexing data obtained on the vulcanizates with the same range of Good-rite Vultrol are recorded in Figure 4. The grooved flexing specimens were aged 24 hours at 212°F. in air test tubes *(4)* and flexed to a standard rating of eight without piercing *(5)*. Good-rite Vultrol is shown to be quite effective in improving flex life from 280,000 to 380,000 flexures over the range studied. As would be expected, the R. F. black vulcanizates are considerably superior to the E.P.C. black compound which shows only 180,000 flexures by the same test.

TABLE II—FINAL RECOMMENDED RECIPE

No. 1 Smoked Sheet	100.0
Zinc Oxide	5.0
R. F. Black	50.0
Stearic Acid	3.0
Agerite H.P.	1.0
Pine Tar	2.0
Sulfur	2.0
Good-rite Vultrol	0.8
Good-rite Erie	1.2

TABLE III—COMPARISON OF R. F. AND E.P.C. BLACK LOADED TREAD VULCANIZATES

	R. F. Black	E.P.C. Black
SS#1	100.0	100.0
Zinc Oxide	5.0	5.0
R. F. Black	50.0	—
E.P.C. Black	—	50.0
Stearic Acid	3.0	2.5
Paraflux	—	3.0
Pine Tar	2.0	—
Agerite H.P.	1.0	1.0
Sulfur	2.0	3.0
Good-rite Vultrol	0.8	—
Good-rite Erie	1.2	1.6
	165.0	166.1

Cure at 290° F.	300%	T	DH	E	300%	T	DH	E
10 Min.	1325	3750	58	635	850	3350	53	640
20 Min.	1800	4125	62	580	1500	4100	62	580
30 Min.	1790	3925	62	585	1700	3900	64	555
45 Min.	1700	3790	63	550	1500	3600	65	560
75 Min	1775	3875	63	555	1475	3600	65	540
20′ @ 240° F.	—	200	20	530	—	100	33	565
40′ @ 240° F.	225	850	40	545	—	700	33	735
Bierer Oxygen Bomb Aging 48 hrs. @ 70° C. 300 lb. O_2 Pressure								
30′ @ 290°F.	1800	3150	66	500	1650	2875	69	500
Percent Change		—20				—26		
Air Bomb Aging 5 hrs. @ 260°F. 80 lb. Air Pressure (ASTM D454-41)								
30′ @ 290°F.	—	900	59	225	—	875	68	305
Percent Change		—77				—78		
Mooney Scorch @ 250°F.		29 Min.				26 Min.		
Mooney Scorch @ 280°F.		10½ Min.				10 Min.		
Goodyear Healy Rebound (60′ @ 290°F.)		53.9				51.5		
Lupke Rebound (45′ @ 290°F.)		48				46		
Comp. Set Method B (45′ @ 290°F.)		30				35		
Hysteresis at 212°F. 55 lb. Load 17.5% Stroke								
60′ @ 290°F.		23		24		25		22
Hysteresis Set		9.0		8.9		13.0		12.9
De Mattia Flex to Rating (8) Aged 24 hrs. at 212°F. in Air Test Tubes (A.S.T.M. D-865-47T) (Unpierced)								
35′ @ 290°F.		380,000				185,000		

In view of the foregoing data, it is concluded: (1) That 0.8 parts Good-riteVultrol produces the desired optimum properties in the R. F. black vulcanizates, and (2) these vulcanizates are by all physical tests equal to and in many ways superior to similarly loaded E.P.C. black compounds.

However, it was decided to determine the effect of a range of sulfur from 1.0 to 2.5 parts, and a new series of vulcanizates were prepared. In these vulcanizates, Good-rite Erie is again maintained at 1.2 parts with Good-rite Vultrol at 0.8 parts, which was shown to be optimum in the previous discussion. Results with these vulcanizates are shown in Figures 5, 6 and 7.

Moduli at 300% on optimum cures are shown in Figure 5. It is obvious that 2.0 parts of sulfur produces a vulcanizate with the highest modulus and that slight reversion is indicated when 2.5 parts sulfur are used.

In the same manner, elongations at optimum cure for the previously mentioned vulcanizates containing a range of sulfur are graphed in Figure 6. Elongation holds quite level up to 2.0 parts sulfur, but starts to fall off with 2.5 parts.

It should be stated here that the procedures used for compounding, mixing, and physical testing, of all the formulations of this discussion, were in accordance with A.S.T.M. Standards on Rubber Products.

Figure 7 shows the improvement in hysteresis properties obtained as the sulfur concentration in the vulcanizates is increased from 1.0 to 2.0 parts. It is interesting to note that above 2.0 parts sulfur, no further improvement in hysteresis is indicated. Hysteresis set follows the same trend, and both are comparable to the very good properties obtained for the E.P.C. control compound.

It is therefore concluded that with 2.0 parts sulfur, maximum physical properties in the R. F. black vulcanizates are achieved.

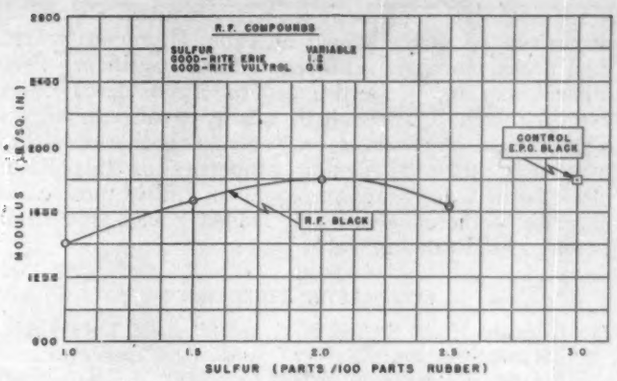


FIG. 5—Modulus at 300% elongation of stocks containing R. F. black and Good-rite Erie (optimum cure).

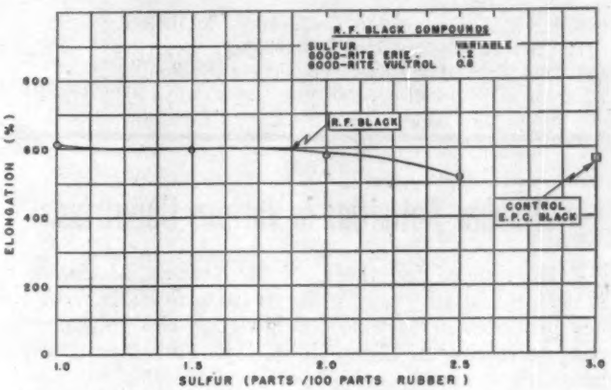


FIG. 6—Ultimate elongation of stocks containing R. F. black and Good-rite Erie (optimum cure).

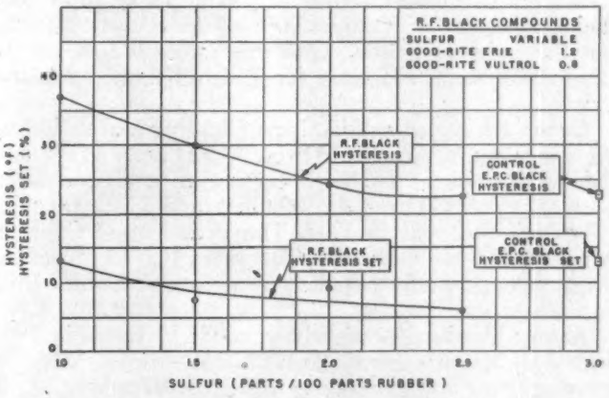


FIG. 7—Hysteresis and hysteresis set at 212° F. of stocks containing R. F. black and Good-rite Erie (55 lb. load, 17.5% stroke).

Summary

To summarize, it is believed that Good-rite Erie acceleration, used in combination with Good-rite Vultrol, for R. F. black loaded natural rubber tread formula-

tions, is worthy of serious consideration. Using the recommended recipe shown in Table II, adequate freedom from scorch is achieved without sacrificing those other important properties generally considered necessary for well balanced high quality tread compounds. The original physicals, scorch and aging characteristics, hysteresis, set, and flexing properties of this R. F. black tread vulcanizate are equal to, and in most cases, superior to the conventionally loaded E.P.C. tread compound, as indicated in Table III.

LITERATURE REFERENCES

(1) Braendle, H. A., Steffen, H. C., and Sheppard, J. R., "Carbon pH and Structure in Rubber Compounding," paper presented before the Division of Rubber Chemistry, A.C.S., Chicago, Ill., April, 1948.
(2) Dannenberg, E. M., and Stokes, C. A., "Processing Characteristics of Reinforcing Furnace Blacks," paper presented before the Division of Rubber Chemistry, A.C.S., Chicago, Ill., April, 1948.
(3) A.S.T.M. Designation D-623-41-T—Method A.
(4) A.S.T.M. Designation D-865-47—T.
(5) 1948 Vanderbilt Rubber Handbook, p. 436.

Rubber Activities in Various Countries

FROM time to time the U. S. Department of Commerce issues statistics pertaining to the manufacture of rubber products in various foreign countries. Some recent data pertaining to Chile, Cuba, Japan and Spain follows herewith:

Chile: Production of tires in 1948 reached a total of 97,713 units, and included 40,885 truck and bus tires and 56,828 passenger car tires. Tube production totaled 91,335 units, or 30,489 truck and bus tubes and 60,846 passenger car tubes. Domestic producers estimate that their output can meet about 90% of the country's needs, but the industry cannot profitably undertake to supply the market with odd sizes for which a limited demand exists.

Cuba: Estimated production of leading Cuban industries included about 58,750 tires, 33,900 inner tubes, and 2,560,430 pairs of rubber footwear in 1948, compared with about 65,880 tires, 41,500 tubes, and 3,740,000 pairs of rubber footwear in 1947. The President of Cuba, in a recent address, assured tire workers that Government requirements would be filled from tires manufactured in Cuba.

Japan: Production of rubber goods in Japan in 1948 included 369,080 truck tires, 379,594 tubes; 181,796 passenger car and motorcycle tires, 185,087 tubes; 19,948 other vehicle tires, 21,217 tubes; (3,796,760 bicycle tires, 3,872,051 tubes; and 28,356,766 pairs of rubber footwear. These amounts were, in each class, greater than in the preceding year, when production included 173,036 truck tires, 172,442 tubes; 80,319 passenger car and motorcycle tires, 95,870 tubes; 7,667 other vehicle tires, 18,957 tubes; 3,016,223 bicycle tires, 3,038,336 tubes; and 21,847,563 pairs of rubber footwear.

Spain: Production of passenger car and truck tires in Spain in 1948 totaled 469,364 units, and represented a decrease of nearly 10% from the output of 518,801 units in 1947. Of the 1948 production, 260,618 were passenger car tires and 208,746 were truck and bus tires. The effect of reduced rubber imports and power shortages was indicated in an output of 204,846 units in the second half of 1948 compared with 264,518 units in the first half of the year.

Recent Reports of Avoidable Accidents

IN a good many cases, accidents in rubber and other factories are due to negligence on the part of those injured. Too often they are caused by a disregard of safety precautions or a direct violation of safety instructions. A few such avoidable accidents, reported in a recent issue of the Rubber Safety News Letter of the National Safety Council, follow:

Wind-ups and Let-Offs: M. K. was attempting to start a liner on a liner shell. She held the liner on the shell with her right hand while turning to push the starting button with her left. Her fingers stuck to the liner, and her right arm was pulled into and around the wind-up.

This fracture of the right forearm was primarily a result of a direct violation of instructions to never start the liner when the machine is operating. Secondarily, it was the result of engineering which provided a starting button within reach of the shell. The simplest and most direct preventive measure is certainly to remove the starting button to a greater distance from the machine. A more fundamental preventive measure, but not so easy, is to train employees to have proper respect for this type of equipment. This employee had worked for many years on the same job.

Material Handling: The job in this case was unloading some drums on an elevated platform. The individual was instructed to lift the pallet load of drums to the platform with a fork lift tractor and roll them off. In order to save time he merely elevated the forks until the edge of the pallet was level with the edge of the platform and proceeded to roll the drums from the pallet to the platform. In the process he stepped through a broken board in the edge of the pallet and fell five feet to the ground.

The direct cause of this injury was plainly direct disregard of specific instructions. Even in the face of this disregard of instructions the injury might have been prevented by more care to avoid the use of defective equipment.

Water Pressure: An employee without instruction on the job attempted to fill a battery with water from an overhead supply. When he jammed the flexible tube into the filling hole of the battery and turned on the water, the battery case exploded under the water pressure and a piece of the case struck him in the face, breaking a lens of his spectacles and injuring his eye.

Repetition of this type of injury will be prevented by providing a tube smaller than the filling hole of the battery. There is also a training problem involved here in convincing employees that they should not attempt to do jobs for which they have not been properly instructed.

Wind-ups and Let-Offs: An employee was attempting to start a Holland liner around the shell of a wind-up. His foot slipped and he stepped accidentally on the starting pedal. Because he knew that the drum could be held by hand he seized the liner and shell firmly. In this instance the drum had become frozen to the driving gear and could not be held by hand, and the man received severe injuries to his hand and forearms.

Poor maintenance in not properly keeping up the driving mechanism and in not keeping the guard over the starting button were responsible for this injury. It could have been avoided by more care in the preventive maintenance program.

Editorials . . . . . .

No Cut in GR-S Prices

WITH the continued decline in the price of natural rubber, additional pressure has been brought on the Office of Rubber Reserve to reduce the price of GR-S. It is argued that unless a price reduction is instituted in the near future, consumption of synthetic rubber will drop sharply, providing the price of natural rubber stays under a 17-cent figure. Even the temptation to use the low temperature polymers because of improved properties may be influenced by the dollar-and-cents economy.

The price of GR-S is still pegged at 18½ cents a pound. According to Rubber Reserve officials, there is little likelihood of that figure being modified in the near future, since the cost of producing GR-S does not warrant any price reduction. Although regular GR-S is being produced at a profit, the new low temperature polymers cost somewhat more to produce. Then, too, the conversion costs must be considered. Accordingly, economy-minded rubber manufacturers using GR-S will have to consider other means of cutting corners.

Progress of the Vinyls

HARDLY a week goes by without witnessing some new or improved use of vinyl film or sheeting. Almost every mail brings news of some new development in the vinyl field. Many of the applications are competitive to rubber, but far more are competitive to other materials, particularly textile fabrics. As one of the Goodrich Chemical technical representatives recently stated, four-gauge film has supplanted King Cotton in many uses—and it very probably will in many more.

Although vinyl resins were calendered into film and sheeting before World War II, it became apparent only about two years ago that these materials could be dressed up. Designing and printing today does not even remotely resemble the type of work turned out two years ago. In light films, for example, there are plaids, weaves of fabrics and designs too numerous to count. Embossing of heavy sheeting has brought new and original designing with surface treatments that give the end-product more realism than leather itself. And this is only the beginning. New possibilities are being discovered almost daily. Rubber manufacturers would be wise to closely watch the progress of the vinyls.

Consumer Trend in Inner Tubes

A DEFINITE consumer trend in favor of the puncture-sealing type of inner tube is developing, according to a survey recently conducted by the *Wall Street Journal*. One Akron manufacturer reported that its puncture-sealing tubes represented 15% of its total tube sales in the first three months of the current year, as compared with only 8% in 1941. Another manufacturer claimed such tubes now represent better than 20% of its total tube sales. As a rule, puncture-sealing tubes bring a premium two to three times that of the regular type of inner tube.

The present crop of puncture-proof and blow-out safety tubes are a far cry from those sold in the early 1930's. During the late war the tire and tube manufacturers learned valuable lessons in making bullet-sealing fuel tanks for military planes and vehicles, and these lessons have resulted in improved puncture-sealing tubes. Tube walls, for example, are thinner to help prevent excessive heat build-up. Tubeless tires, too, are beginning to catch the public fancy, as is evident from expanding production announced by Goodrich.

CURRENT NEWS OF THE MONTH

HAVANA CHARTER AGREEMENTS SCORED AT RMA CONFERENCE

If Congress votes its approval of the Havana Charter for an International Trade Organization, it will pave the way for rubber cartels and higher rubber prices. This was one of the points made by opponents of the I.T.O. plan to bolster world trade at a special conference sponsored by the Rubber Manufacturers Association on June 28 at the Hotel Roosevelt in New York City. Backers of the plan contended that the I.T.O. Charter establishes democratic ways within the United Nations by promoting world trade. Without a charter, they said, rubber producing nations can enter into a scheme to restrict output and raise prices.

The charter was drafted by representatives of 54 nations during a four-month United Nations conference on trade in Havana during the winter of 1947-48. Two years of international negotiation preceded the conference. It will go into effect for the ratifying countries when 20 nations have joined. So far, only Australia has joined, and her joining is contingent upon the United States and Great Britain's approval. The idea for the I. T. O. Charter was advanced by the U. S. State Department late in 1945. While some of its provisions are not what the American delegates wanted, the charter is recognized as the U. S. viewpoint.

The RMA conference on June 28 saw eight of the nation's leading authorities on the charter probing the ramifications of the plan in open debate. The conference brought together representatives of companies representing more than 90% of the nation's rubber consumption for the largest meeting the rubber manufacturing industry has held in more than a decade.

Case Against the Charter

The morning session of the conference was devoted to the case against the charter presented by Elvin H. Killheffer, formerly vice-president of E. I. du Pont de Nemours & Co., Inc., and advisor to the American delegation at the Havana Conference, Philip Cortney, president of Coty, Inc., and Michael A. Heilperin, economist for the Bristol-Myers Corp., and delegate for the International Chamber of Commerce to the Geneva and Havana Conferences on the International Trade Organization.

The defense of the charter was presented by William L. Batt, president of SKF Industries and chairman of the Committee for the International Trade Organization, Clair Wilcox, professor of economics at Swarthmore College and former director of the Office of International Trade Policy, U. S. Department of State, and Morris Rosenthal, president of Stein, Hall & Co., New York.

Criticism and Approval

Dr. Killheffer charged that State Department negotiators "exceeded their authority" in agreeing with Great Britain to place a limit on the amount of synthetic rubber consumed in the United States. Present regulations providing that a fixed percentage of the rubber consumed in this country shall be synthetic were called wise by Dr. Killheffer, who confined his criticism to our understanding with the British that this percentage would not be exceeded.

Mr. Heilperin declared that the proposal for I. T. O. provided for the establishment of a socialistic system, which was desired by Great Britain and a number of other countries. Mr. Cortney condemned the charter as "codifying exceptions to principles in such a manner that the exceptions become in fact the rules the participating nations are to abide by." He said that the charter would result in the imposition of controls that would restrict international trade, and charged that it resulted from this country's failure to approach the British financial problems in "an intelligent and courageous manner."

Mr. Rosenthal sounded the keynote for the I. T. O. proponents, declaring that while it would not end all of this country's economic problems in world trade, the charter offered a "beginning of a solution." He expressed the belief that in time it would result in expanding our foreign trade, through the gradual elimination of tariff barriers, preferences, quotas and other restrictions.

Mr. Wilcox told the rubber manufacturers that the I. T. O. would give consuming nations a means of checking on future international agreements concerning the production and marketing of rubber. Fewer, and not more, such agreements would be made as a result of I. T. O., he contended.

Estates in India

Under the terms of the Rubber Act of 1947, all rubber estates in India are required to register with the Indian Rubber Board. Up to September 30, 1948, a total of 10,869 estates had been registered, covering a total planted area of 153,403 acres. In the first nine months of 1948 the Board issued 101 new licenses for planting.

OUTPUT OF SYNTHETIC RUBBER TOTALS 600,000 TONS IN 1948

United States production of synthetic rubber remained constant in 1948 with a total output of 1,200,000,000 pounds, approximately the same as in 1947, according to preliminary figures by the U. S. Tariff Commission. Sales were somewhat smaller than in 1947, however. GR-S, used chiefly in tires, reached a production total of 882,000,000 pounds in 1948 or 3.7% less than in 1947. Tariff Commission chemical officials said that the drop is relatively insignificant as a guide to trends.

Cyclic elastomers, all GR-S type, accounted for 75% of the output of all elastomers, approximately the same as in 1947. Sales of GR-S totaling 750,000,000 pounds were valued at $139,000,000. Production of special purpose type of acyclic elastomers in 1948, principally butyl, polyvinyl and neoprene, was 291,000,000 pounds or 3,400,000 pounds greater than the 287,000,000 pounds reported for 1947. Sales of these elastomers in 1948 totaled 294,000,000 pounds, valued at $98,000,000, slightly smaller in quantity but larger in value than in 1947.

Sale of Rubber Chemicals

The Tariff Commission also issued preliminary figures showing a decline in the United States production and sale of chemicals used in processing rubber. Total production of 96,000,000 pounds of such chemicals in 1948 was 4.7% less tthan the 101,000,000 pound output of 1947. Sales in 1948, valued at $36,400,000, were also somewhat smaller than those for 1947.

The output of cyclic rubber-processing chemicals, chiefly accelerators and antioxidants, was 81,900,000 pounds in 1948 compared with 85,800,000 pounds reported for 1947. Sales of these compounds in 1948 amounted to 60,000,000 pounds, valued at $27,000,000. The production of acyclic rubber processing chemicals, which includes accelerators, peptizers, antioxidants, etc., amounted to 14,200,000 pounds in 1948 as compared with 14,900,000 pounds in 1947.

Although the output of these acyclic chemicals as a group declined slightly in 1948 as compared with 1947, the output of some of the chemicals in the group increased, especially acyclic accelerators. Output amounted to 5,900,000 pounds in 1948 compared with 4,400,000 pounds in 1947. Sales of all acyclic rubber—processing chemicals in 1948 amounted to 11,400,000 pounds, valued at $9,400,000.

The Tariff Commission stated that figures for the 1948 production and sale of rubber-processing chemicals and those for the production of synthetic rubber are 95 to 97% complete.

COMMITTEE ON SAMPLES TENDERS REPORT TO ASTM

The formation of a Committee on Standard Samples to work with the Bureau of Standards in the development of a series of standard rubber samples was authorized by Committee D-11 of the American Society for Testing Materials at its June, 1947, meeting. Since that time the committee has had frequent meetings and has carried out some laboratory work. A report on its work to date was recently submitted to the membership.

One of the first problems faced by the committee was the necessity of determining what the composition of the standard samples should be. Since the commercially available rubbers are now quite numerous and the types of recipes used with these rubbers are equally numerous, the committee decided that the number of recipes would have to be limited to prevent the program from becoming unwieldy. It was also necessary to keep the number of compounding ingredients to the barest minimum.

After much discussion, the initial list of type recipes was reduced to thirteen, including six natural rubber recipes (three of varying durometer hardness), two GR-S, two neoprene, two Butyl, and one nitrile rubber. Standard curing temperatures recommended are 140° C. for the natural rubber and neoprene stocks and 150° C. for all the others. The standard time intervals for a series of cures are 10, 20, 40 and 80 minutes.

As a part of the program the committee also considered it desirable to have available for sale to the rubber industry the standard compounding ingredients from which the standard recipes could be prepared. To date seven of these materials are available as NBS standards, including zinc oxide, sulfur, stearic acid, benzothiazyl disulfide, tetramethyl thiuram disulfide, channel black (EPC), and light magnesia. Materials required to complete the list for the thirteen recommended recipes include all of the rubbers, SRF black, acetylene black, and PBNA.

The committee, in its report, proposes that the thirteen standard recipes recommended, the mixing procedures found most suitable for each of them ,and the curing times and temperatures be made part of A.S.T.M. Method D-15. This, however, cannot be accomplished until the program is further advanced. Copies of the committee's report, including the thirteen suggested standard recipes, can be secured from the secretary of Committee D-11, Arthur W. Carpenter, B. F. Goodrich Co., Akron, Ohio.

The Committee on Standard Samples is headed by A. E. Juve as chairman, and includes L. V. Cooper, G. C. Maassen, A. T. McPherson, S. R. Doner, J. T. Blake and J. H. Fielding.

Acorn Insulated Wire Moves

Acorn Insulated Wire Co., Inc., formerly located in Brooklyn, N. Y., has moved its plant and offices to 36 Freeman St., Pawtucket, R. I. Most of the personnel of the Brooklyn plant have moved to Pawtucket.

NEW APPOINTMENTS ANNOUNCED BY A. SCHRADER'S SON DIVISION

G. H. Schneider C. H. Wilkens D. C. Baker

A new series of appointments have been announced by A. Schrader's Son Division of the Scovill Manufacturing Co., Inc., Brooklyn 17, N. Y. Clarence H. Wilkens has been appointed assistant sales manager of the division in charge of the Akron office succeeding Malcolm Stevens who retired on June 1, after 25 years as manager of the Akron branch. Mr. Wilkens joined Schrader in 1916 at the Brooklyn plant. Prior to his transfer to Akron in 1922 in a technical service capacity, he represented Schrader among tire manufacturers in New England, Southern and Mid-Western states. For the past 14 years, he has functioned as service manager of the company with headquarters in Akron, and has been very active as a representative of his organization in the Tire and Rim Association.

In another appointment, Donald C. Baker was named service department representative of the division in the Akron area. Mr. Baker will handle service contacts in the field formerly covered by Mr. Wilkens. Mr. Baker joined the Schrader organization after a period of service with the Marine Corps in World War II.

George H. Schneider has been named manager of technical service for the Schrader division. Mr. Schneider joined the company in 1920 and has spent the principal part of his career in service work. He will make his headquarters in the Brooklyn office of the Schrader division.

Committees Welcome Participation

An invitation to those interested in adhesives to attend future meetings and participate in its work has been issued by Committee D-14 on Adhesives of the American Society for Testing Materials. This group embraces the entire field of adhesives and is not limited to any special group of the more widely used materials. At present the membership consists of 32 consumer members, 36 producer members and 17 general interest members. The development and approval of several tentative standard test methods has already been achieved and work on additional standards is progressing satisfactorily. The next meeting of the committee is scheduled for October in Philadelphia. Information and details concerning the activities of A.S.T.M. Committee D-14 can be obtained from its secretary, George W. Koehn, Research Laboratories, Armstrong Cork Co., Lancaster, Penna.

Filo Pigment Chart Available

Filo Color & Chemical Corp., 11 Broadway, New York 4, N. Y., has recently published a concise bulletin indicating the chemical and physical properties of the important inorganic and organic chemical pigments used by the rubber industry. The pigments are itemized as to container dimensions, characteristics and properties, and suggested uses. The bulletin is available to interested parties upon request to the company.

Ucon Heat-Transfer Fluids

Carbide and Carbon Chemicals Corp., New York 17, N. Y., has announced the production of a series of heat-transfer fluids with unusual resistance to sludging and coking. These new synthetic fluids are made from polyalkylene glycols and derivatives and differ chemically and in performance characteristics from petroleum oils, from the silicones, and from the synthetic oils developed in Germany during the war. Experience shows them to be most valuable as heat-transfer liquids in a temperature range from 60° up to 500° F. They are characterized by low pour points and have little change in viscosity with temperature. They have a minimum effect on various types of rubber and packings. Both water-soluble and water-insoluble fluids are available in various viscosities under the trade-mark "Ucon."

Roberts Tire Tapper

Halkey-Roberts Corp., Paramus, N. J., has introduced the Roberts Tire Tapper, a unit which will permit the transfer of air from a spare tire to an inflatable item. It fits any standard valve and may even be attached to flexible tubing. The Roberts Tire Tapper, specifically designed for use when inflation by mouth or pump is inconvenient or undesirable, is adaptable to any item from a beach mattress to a swim ring or football. The unit is small in size, non-corrosive, and simple enough for a child to operate.

U. S. SUES TO DIVEST DUPONT OF U. S. RUBBER, GM INTERESTS

The United States Department of Justice filed suit, on June 30 in United States District Court in Chicago, Ill., to break up what it called "the largest single concentration of industrial power in the United States"—a combine of corporations allegedly controlled by E. I. du Pont de Nemours & Co., Inc., and including the U. S. Rubber Co., General Motors Corp., and others. Named as defendants in the civil action, in addition to the corporations, were more than 100 individuals, including leading members of the DuPont family.

The chief objective of the suit is the disposition by DuPont of all its holdings in U. S. Rubber, and of its 10,000,000 share investment in General Motors. DuPont holdings in U. S. Rubber are said to represent interest "sufficient to give them control," since the remaining shares are held in small amounts by about 14,000 stockholders. The investment in General Motors represents 23% ownership of the company.

Other steps sought by the Department of Justice suit are the disposition by DuPont and General Motors of their interests in the Ethyl Corp., and the sale by DuPont of its manufacturing interest in tetraethyl lead, ethyl fluid and ethyl chloride. It further sought cancellation of all existing contracts between General Motors, DuPont and U. S. Rubber dealing with the sale of products, grants of licenses under patents, and for the exchange of product information.

Anti-Trust Law Violation

The Government's complaint accused the defendant companies of violation of the Sherman and Clayton Anti-Trust Laws by conspiring in a number of ways to deprive independent companies of business. These charges assert that the DuPont company and members of the DuPont family control the selection of officers and directors and shape the policies of both the U. S. Rubber Co. and General Motors. This control, it is charged, has been utilized to stifle competition.

The complaint listed these specific charges:

(1) DuPont requires that the manufacturing defendants purchase substantially all their requirements for certain products from each other, thus freezing out other suppliers.

(2) The DuPont company has expanded its own facilities through acquisition of competing concerns and enlargement of existing plants. This, it is alleged, enabled DuPont to produce in quantity products in the chemical and related fields needed by the rubber and automobile companies.

(3) U. S. Rubber and General Motors were "forced" by DuPont to expand their manufacturing facilities and to enter new fields of manufacture for the purpose of enlarging the "closed and guaranteed market" for sale of DuPont products.

(4) DuPont subsidized its own expansion by using profits from product sales to General Motors and U. S. Rubber. These sales were made, it was charged, under "closed and non-competitive" market conditions.

(5) DuPont granted systematic rebates and preferential prices on its products and sold the same products to other companies at higher prices. These practices, the complaint said, enabled DuPont to "subsidize" the expansion of General Motors. DuPont, the complaint added, also required U. S. Rubber to give price preference to General Motors on tires and tubes for equipping new cars and trucks and asked higher prices of other automobile manufacturers.

DuPont Issues Denial

Crawford H. Greenwalt, president of E. I. du Pont de Nemours & Co., Inc., denied the Government accusations in a statement which said that the "company emphatically denies that its relationships with General Motors and the other companies mentioned in the complaint have been illegal or detrimental to the interests of the people of the United States. On the contrary, these relationships have served the public interest in a conspicuous way; and in that firm belief we will defend our present position with the utmost vigor.

"Since these relationships have been a matter of public record and public information for many years, the motive for this suit must arise out of a determination by the Department of Justice to attack bigness in business as such. We cannot believe that such a position is, or will be, supported by the American people because, in the end, it would increase prices, reduce living standards and even weaken the national security."

Statement by U. S. Rubber

Herbert E. Smith, chairman of the board of the U. S. Rubber Co., in answer to the Government's anti-trust suit said that "the United States Rubber Co. is a leader in one of the most highly competitive industries in America. We are in business to serve the public by providing the best possible products at the lowest possible prices. All our relationships with other companies are designed to help us acheive this objective. All our relationships are legal and fair to the public.

"We believe that a company, like an individual, prospers only to the extent that it serves, and that bigness in business is a reliable sign of service. We deny the Government's charge that we are violating the anti-trust laws."

The Federal grand jury's investigation of DuPont opened on November 17, 1948. In September, the Justice Department's Anti-Trust Division disclosed that it was opening the investigation when it served subpoenas on five companies and issued subpoenas for the books and records of eight others.

RUBBER DIVISION 55TH MEETING SCHEDULED FOR SEPTEMBER 21-23

The 55th meeting of the Rubber Division of the American Chemical Society will be held in conjunction with the 116th meeting of the parent society at Atlantic City, N. J., on September 21 to 23. Headquarters for the Rubber Division will be the Chalfonte-Haddon Hall, and the first session will start 2 o'clock, Wednesday, September 21. The usual banquet will be held on Thursday evening, September 22.

Lawrence K. Youse of the Gilmer Division of the U. S. Rubber Co. is chairman of the Local Arrangements Committee. Matters have been so arranged that while all of the activities of the division will be centered at the hotel, frequent bus service will permit members to attend meetings of other divisions at the Atlantic City Auditorium.

C. R. Haynes, of the Binney & Smith Co., secretary of the division, has requested that abstracts of papers to be considered for presentation at the meeting be in his hands by July 15. Abstracts should run from 400 to 500 words. Three copies of the abstracts are required, together with business connection of the author, the laboratory in which the work was done, the name of the person who will deliver the paper, and the time required for presentation.

Aircraft Tire Testing Unit

In order to determine what happens to tires when planes touch down at high speeds, engineers are constructing a miniature "runway" which will spin while the aircraft remains stationary. The unusual "landing strip" is a big steel flywheel seven feet in diameter and three feet wide. It will revolve at speeds up to 250 miles per hour. When a plane's wheels, mounted on a separate shaft, are moved against the whizzing drum the tire will get the same shock it would receive if the plane were landing at that speed. The drum-shaped airstrip will be installed in one of the laboratories of the U. S. Air Force at Wright Field, Dayton, Ohio. It is being constructed by the Adamson United Co., Akron, Ohio. Its power unit, a 150 horsepower electric motor, will be built by Westinghouse Electric Corp.

Offer New Production Booklets

The American Management Association, 330 West 42nd St., New York 18, N. Y., has made available a number of new booklet reports in its series of production analyses. The booklets can be secured direct from the association for 75 cents a copy. Among the latest booklets are the following: Organizational Teamwork in Production; Worker Morale and Productivity; Building Worker Interest in Production Problems; The Basis of Production Planning; Administrative and Statistical Techniques of Quality Control; New Controls for Fixed and Variable Costs; Cost Controls for Packing, Shipping and Warehousing; Personnel Functions and the Line Organization.

PASSENGER CASING SHIPMENTS IN APRIL UP 16% OVER MARCH

Manufacturers' shipments of passenger casings during April totalled 5,666,650 units, an increase of 15.70% over March when 4,897,869 casings were shipped, according to a recent release of the Rubber Manufacturers Association. Truck and bus casing shipments declined in April to 944,093 units from the 1,004,719 shipped in March, a decline of 6.04%. Total automotive casings shipped in April amounted to 6,610,743 units, 12% greater than the 5,902,588 casings shipped in March.

A total of 6,959,315 automotive casings were produced in April against the 6,577,503 produced in March. Of the April total, 5,939,645 were passenger casings and 1,019,670 were truck and bus casings, compared with 5,361,336 and 1,216,167, respectively, in March.

As of April 30, 1949, 10,705,291 passenger casings and 2,485,314 truck and bus casings were on hand for a total of 13,190,605. These figures compare with the 10,669,721 passenger casings and 2,420,855 truck and bus casings for a total of 13.090,576 casings on hand at the end of March, 1949.

Passenger and truck and bus tubes produced in April totalled 6,058,992 units, against the 5,947,598 tubes produced in March. Shipments of tubes during April amounted to 5,396,411 units, compared with the 5,173,772 units shipped in April. Inventories at the end of April showed 11.747.607 tubes on hand. while at the end of March, 11,230,827 tubes were on hand.

Help for Laboratory Routine

An invisible coating of G-E Dri-Film water repellent has reduced an eight-hour dishwashing chore to a few minutes of rinsing at the Naugatuck, Conn., laboratory of the U. S. Rubber Co. where production samples of sticky latex are drawn off daily into hundreds of small glass dishes for quality analysis. Company chemists say that the General Electric repellent is the best material they have yet found to prevent the adherence of latex to glass. One laboratory employee who formerly spent a full day scrubbing petri dishes with abrasives now cleanses them quickly and economically with running water. Easily applied, Dri-Film is thinned to a 10% solution before being poured into the dish. After the excess is drained off. the container is dried in a 200° F. circulating oven for 15 minutes. Dishes so treated can be used and cleaned five times before another application is required.

John Westendorf Heads Premier

John Westendorf, associated with the Premier Rubber Manufacturing Co., Dayton, Ohio, since 1922, has been elected president of the company succeeding his brother Joseph F. Westendorf, who died on June 6. Louis R. Jacobs has been appointed general manager of the company. Joseph L. Leibold has been elected secretary.

WYANDOTTE NAMES VODRA AND JARVIS TO SERVE RUBBER INDUSTRY

Victor H. Vodra

L. Aubrey Jarvis

Victor H. Vodra and L. A. Jarvis have recently joined the Sales and the Research-Development Divisions of Wyandotte Chemicals Corporation. Both men will specialize in rendering service to users of the rubber grades of Wyandotte precipitated calcium carbonate.

Mr. Vodra attended the University of California at Los Angeles and was employed, for 5 years following graduation, by the Goodyear Tire and Rubber Company. He holds a Master Rubber Workers Degree, was a member of the Goodyear Flying Squadron for two years, and for three years was a compounder and chemist in their Compound Service Division.

Following a year as chief chemist and plant superintendent with the Sierra Rubber Company, Mr. Vodra became Pacific Coast Representative for the R. T. Vanderbilt Co. During his more than five year stay with Vanderbilt he helped establish the Technical Division of both the Los Angeles Rubber Group and the Northern California Rubber Group. During the war Mr. Vodra taught an advanced technical course in compounding and processing synthetic rubbers at the University of Southern California.

For the past year Mr. Vodra has been operating his own business in Portland, Oregon, under the name of the Northwest Research and Development Company, developing items of rubbers and plastics and selling applications of protective coatings.

L. Aubrey Jarvis is a graduate of Michigan State College, and has spent the past five years in Akron with the Firestone Tire and Rubber Company. Mr. Jarvis has served as a technical representative, as a compounder and process chemist, and has done advanced work at the University of Akron.

Mr. Vodra is now a special sales representative of Wyandotte Chemicals' Michigan Alkali Division. Mr. Jarvis is carrying out compounding and application research in Wyandotte's rubber laboratories. Both men will be devoting their full time to the application and sales of precipitated calcium carbonates and other specialized chemicals for the rubber industry.

Thermoid Guarantees Prices

A sixty-day retroactive guarantee against price reductions on automotive replacement products, effective June 1 and continuing through December 31, was announced recently by the Thermoid Co., Trenton, N. J. Company officials stated that the action is designed to help the company to keep production on an even keel. This will allow distributors to build up depleted stocks and enable them to properly service dealers and jobbers. At the same time, it will protect them from any possible decline in prices. In the event that there is any reduction in price between June 1 and December 31, price reductions will be retroactive for 60 days from the date it was put into effect. On any purchase made during the 60 days preceding any possible price reduction, the dealer will get a credit to the extent of any difference in price.

DuPont Rayon Division Changes

Five changes in the sales organization of the Rayon Division were recently announced by E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. V. Ward Smith, who has been assistant director of sales since 1947, now concentrates on Cordura high-tenacity rayon sales and all indirect sales activities in the division. Ford B. Draper, formerly manager of staple sales, has been named an assistant director of sales to take charge of textile rayon and staple. W. Samuel Carpenter, III, who has been assistant to the director of production, has been appointed assistant manager of Cordura rayon sales. Dr. W. W. Owen, formerly in technical service, has been transferred to Cordura sales as a special representative. V. S. Van Scoy, assistant manager of the technical service section, has been appointed manager of the new sales development section.

REGIONAL MEETING IN HAMILTON HELD BY CIC RUBBER DIVISION

Approximately 85 members and guests attended the regional meeting of the Rubber Chemistry Division of the Chemical Institute of Canada held on June 10 at the Royal Connaught Hotel in Hamilton, Ontario. The meeting, the fourth held to date by the division, featured the presentation of eight technical papers, the election of officers, and a divisional dinner.

Titles of the eight technical papers were as follows: *Plasticity of Reclaimed Rubber,* F. L. Kilbourne (Xylos Rubber Co.); *Statistical Techniques in the Rubber Industry,* W. H. Schmalz (Dominion Rubber Co.); *Evaluation of Flex Life and Heat Build-Up Properties of Elastomers,* E. B. Storey (Polymer Corp.); *Elongation Hysteresis of Hevea and Synthetic Elastomers,* M. Mooney and S. Black (U. S. Rubber Co.); *Some Recent Developments in Special-Purpose Polymers,* G. W. Flanagan (B. F. Goodrich Chemical Co.).

Also, *Training for More Efficient Engineering and More Productive Supervision,* D. H. Stevens (Goodyear Tire & Rubber Co. of Canada); *Inadequacy of Laboratory Evaluation of Natural and Synthetic Rubbers,* H. A. Braendle, H. C. Steffen and J. G. Dewender (Columbian Carbon Co.); *Evaluation of Processability,* N. R. Legge and S. T. Einhorn (Polymer Corp.). Abstracts of all of these papers were published in our May, 1949, issue. Some of the papers will be published in full in an early issue of this journal.

A business meeting of the Division was held during the technical session during which nominations for new officers were introduced and an election held. The election resulted in the following slate of officers for the 1949-50 season: *Chairman,* John Ramsay (Gutta Percha & Rubber); *Vice-Chairman,* J. T. Black (Polymer Corp.); *Secretary-Treasurer,* N. W. Smith (Dominion Rubber). Members elected to the Executive Committee included George Stevens (Canadian Goodyear), R. B. Marr (Naugatuck Chemical), and M. Reinhardt (Canadian Goodrich). M. F. Anderson (Dominion Rubber) was chairman of the Nominating Committee.

A complete set of by-laws for the Division was approved during the business meeting. These by-laws were proposed at the last meeting of the Division, held in Montreal last year, and subsequently were distributed to the members for study and suggestion. Several changes were recommended and made at the Hamilton session.

Featured speaker at the division dinner, held in the evening at the Royal Connaught, was K. P. Chamberlain, vice-president of the Gates Engineering Co. of Newcastle, Delaware. Before Mr. Chamberlain's talk, Harold G. Deline (Dunlop Rubber), the retiring chairman, expressed his thanks to his co-officers and the members of the Executive Committee, and to the committee in charge of the Hamilton meeting. He then introduced Garnet T. Page, business manager of the C.I.C., who asked the members of the Division to give active support to *Chemistry in Canada,* the new official journal of the Institute.

Food-for-Mind Program

CARE, the non-profit agency, has embarked upon a "food for the mind" program to rebuild the war-wrecked libraries of Europe and Asia. The plan works this way: Libraries, universities and other educational institutions in 14 war-devastated countries are being asked to supply a list of their book needs. Through contributions from the American people, CARE will then fill those needs as closely as possible by purchasing the best books in those fields published in the United States. Only new books are involved. Contributions can be sent to CARE headquarters, 20 Broad St., New York 5, N. Y., or to any CARE outlet throughout the country.

Mr. Chamberlain, the principal speaker, was introduced by George Aitken, of Waterous, Ltd. In his talk Mr. Chamberlain recounted some of his experiences in Europe, which he visits frequently, particularly the Scandinavian countries. He expressed the opinion that Europe was far ahead of the United States in the development of new applications for plastics, and warned the rubber industry to watch plastics progress carefully so that it could protect its competitive position. At the conclusion of his talk, Mr. Chamberlain, an amateur magician of considerable note, entertained his audience for over an hour with legerdemain.

A High Polymer Forum, under the auspices of and sponsored by the C.I.C., was also held in Hamilton on June 9 and 10 at McMaster University. The Forum featured eleven papers including the following: "Emulsion Polymerization of Isoprene," by R. H. Clark (University of British Columbia); "Osmotic Molecular Weights of GR-S Copolymers," by D. A. Henderson and N. R. Legge (Polymer Corp.); and "Fractional Precipitation of GR-S and the Viscosity Behavior of the Fractions," by D. F. Switzer and L. H. Cragg (McMaster University).

The next meeting of the C.I.C. Rubber Chemistry Division will be held in Toronto in conjunction with the regular meeting of the parent society.

Buffalo Schedules Outing

Baseball, golf, horseshoes, plug casting, volley ball and other activities have been scheduled for the annual outing of the Buffalo Rubber Group to be held this year on July 30 at the Lancaster Country Club, Buffalo, N. Y.

Connecticut Summer Outing

The annual summer outing of the Connecticut Rubber Group will be held this year on September 17 at Scollins Grove, Long Hill, Connecticut. Athletic and other activities are being planned for the day.

BOSTON 13TH ANNUAL OUTING FEATURES GOLF TOURNAMENT

Approximately 400 members and guests attended the 13th Annual Summer Outing of the Boston Rubber Group held on June 24 at the United Shoe Country Club, Beverly, Mass. A golf tournament featured the day's activities which included softball, horseshoes, tennis, darts, bowling and other games. An excellent lobster dinner was served at the conclusion of the athletic activities. Prizes were awarded for the sports events and a door prize given everyone in attendance.

John Andrews (Cabot) served as chairman of the Outing Committee assisted by Edward Covell (Stedfast Rubber) and Harry Atwater (Hood Rubber). Winners of the different events of the golf tournament included the following:

Kickers Handicap—R. B. Patterson, C. J. Reckles, J. J. Breen, R. O. Babbitt, John Hussey, Carl Mayerhauser, Allen Richards; *Low Gross*—A. E. Nelson, W. A. Maguire, Phil Salamon, C. H. Hamilton, H. B. Bainbridge.

Low Net—L. L. Longworth, F. N. Barrett, R. Tedford, E. W. Kisher; *Nearest Pin on 6th Hole*—C. J. Reckles, C. H. Hamilton; *Longest Drive on 18th Hole*—A. R. Loosli; *Highest Score 6th Hole*—Allen Richards; *Highest Net Score*—A. T. Johnson; *Highest Gross Score*—Fred DeBaggio.

The softball game was won by a team representing the Stedfast Rubber Co. with T. Freeman as captain. Winners in other events included: *Horseshoes*—P. L. Blanchard, J. C. Cameron; *Tennis*—John LaBelle, E. Dannenberg; *Darts*—E. Pease, C. M. Grafton; *Bowling*—Milt Washburn, Ed Covell, L. Clark, Joe Holland, W. Anderson, George Herbert.

Catton Addresses Philadelphia

The June 3 meeting of the Philadelphia Rubber Group, held at the Poor Richard Club, 1319 Locust Street, Philadelphia, Penna., was addressed by Neil L. Catton, Group Head of Mechanical Goods Compounding and Sales Service, Rubber Laboratory, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. Mr. Catton spoke on the "Processing Characteristics of Neoprene." His talk was identical to one he delivered before the Connecticut Rubber Group in February, which was published in full in the April issue of RUBBER AGE.

Washington Elects Officers

The Washington Rubber Group, Washington, D. C., has announced the results of the recent election of officers for the 1950 season. Members elected to office include: *President,* R. J. Devereaux (Goodrich); *Vice-President,* T. A. Werkenthin (Bureau of Ships); *Secretary,* Norman Bekkedahl (Bureau of Standards); *Treasurer,* E. A. Buzkin (Bureau of Ships); *Recording Secretary,* Ethel Levene (Bureau of Ships).

NO. CALIFORNIA HEARS ROSTLER ON PLASTICIZING NEW POLYMERS

The Northern California Rubber Group meeting of June 30 was held in two different sessions, an afternoon golf tournament at the Richmond Golf Club, and a technical meeting in the evening at the Hotel Claremont, Berkeley, Calif. The evening session was addressed by Dr. Fritz S. Rostler, director of research and development for the Golden Bear Oil Co., Oildale, Calif. Dr. Rostler spoke on "A Chemical Approach to Plasticizing New Polymers."

Dr. Rostler pointed out that plasticizing is not only the first step in compounding a new polymer but that it is also the first major difficulty in dealing with new polymers. The selection of proper plasticizers is an important task of compounders. It was pointed out that with petroleum products, physical characteristics, as well as numerical expressions based on these characteristics in use, were originally developed to be expressions of properties which are only of subordinate interest in rubber compounding. Viscosity index, viscosity-gravity constant, and flash point are such characteristics.

Since these characteristics are not descriptive of behavior in rubber, the selection of suitable plasticizers had to be done by the trial and error method—mixing and testing innumerable products. Dr. Rostler showed that by using a method of defining petroleum products on the basis of a quantitative analysis in terms of percentage composition of five basic groups of components, exact prediction of performance can be achieved by a much less cumbersome procedure.

The composition of Golden Bear petroleum products manufactured for rubber compounding was shown in the form of manufacturing specifications. The speaker discussed the individual components of petroleum plasticizers and gave as an example how Califlux T.T., the grade recommended for cold rubber, was designed. Various methods of incorporating black and the question of premixing black with plasticizers were also discussed. The speaker showed at which stage of the mixing black and plasticizers are to be incorporated and at which ratio black and plasticizers can be safely premixed before incorporation. Dr. Rostler's talk was illustrated by a number of slides.

Golf Tournament Results

Winners of prizes at the golf tournament held on the afternoon of June 30 at the Richmond Golf Club included: George Farwell (Goodyear), Fred Swain (Goodyear), Leo Eneboe (American Rubber Mfg.), Bill Snyder (R. T. Vanderbilt), Rolf Hassarud (Food Machinery), John McSparran (C. P. Hall), Stanley Mason (Pioneer Rubber), John Mason (Pioneer), Russ Kettering (Oliver Tire), Ed Munier (Oliver Tire), and Ed Coxhead (Goodyear). Clint Vincent (Connecticut Hard Rubber) won a prize for low gross and Wayne Shipley (Tire Center) won low net.

Coming Events

July 23-24. Los Angeles Rubber Group, Outing, Catalina Island, Calif.

July 30. Buffalo Rubber Group, Outing, Lancaster Country Club, Buffalo, N. Y.

Aug. 9. New York Rubber Group, Golf Tournament, Winged Foot Golf Club, Mamaroneck, N. Y.

Sept. 17. Connecticut Rubber Group, Outing, Scollins Grove, Long Hill, Conn.

Sept. 18-23. American Chemical Society, 116th National Meeting, Atlantic City, N. J.

Sept. 22. Southern Ohio Rubber Group. Engineer's Club, Dayton, Ohio.

Sept. 29. Northern Calif. Rubber Group, Claremont Hotel, Berkeley, Calif.

Oct. 4. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Calif.

Oct. 7. Detroit Rubber Group, Detroit-Leland Hotel, Detroit, Mich.

Oct. 10-14. A.S.T.M., West Coast Meeting, Fairmont Hotel, San Francisco, Calif.

Oct. 14. Boston Rubber Group, Somerset Hotel, Boston, Mass.

Oct. 21. N. Y. Rubber Group, Henry Hudson Hotel, New York City.

Oct. 24-28. 37th National Safety Congress and Exposition, Chicago, Ill.

Dec. 9. Detroit Rubber Group, Detroit-Leland Hotel, Detroit, Mich.

Dec. 10. Southern Ohio Rubber Group, Miami Valley Golf Club, Dayton, Ohio.

Dec. 16. N. Y. Rubber Group, Henry Hudson Hotel, New York City.

Dec. 16. Boston Rubber Group, Somerset Hotel, Boston, Mass.

QUEBEC GROUP ELECTS OFFICERS; HOLDS ANNUAL GOLF TOURNAMENT

The Quebec Rubber and Plastics Group held an election of officers for the 1950 season at its annual golf tournament on June 17 at Granby, Quebec. Members elected to office include: *Chairman,* Arthur Bales (British Rubber); *Secretary-Treasurer,* Harry Kushnarov (Dominion Rubber). Arthur Pinard (Canadian Resins & Chemicals) and Herb Harrington (Dominion Rubber) were elected to serve on the Executive Committee for 1950.

Golf scores at the tournament were calculated on the basis of the Atlantic Handicap system and, consequently, there were prizes for every class of player. After the game, players went to the Granby Hotel for cocktails and dinner. Approximately 100 members and guests were present at the hotel. Arthur Bell (St. Lawrence Chemical) and Norman Burnett (H. L. Blachford) organized the tournament.

A technical report on the use of Butex, a butyl inner tube reclaim, for light and ozone resistance, has been made available by the Midwest Rubber Reclaiming Co. Ask for Report No. 12.

CONNECTICUT HEARS WOODRUFF ON RADIOISOTOPES IN RESEARCH

The May 20 meeting of the Connecticut Rubber Group held at Convention Hall, General Electric Co., Bridgeport, Conn., was addressed by Dr. Nathan H. Woodruff, assistant chief of the Isotopes Division, Atomic Energy Commission, Oak Ridge, Tenn. Dr. Woodruff spoke on the subject "Radioisotopes as Research Tools." The main body of the speaker's paper was built around a series of slides illustrating the use of radioactive materials. The slides emphasized the ability of radioactive isotopes to trace atoms, molecules and labeled substances through complex physical, chemical and biological systems.

Slides were also included to show the applications of radioisotopes as sources of ionizing radiation. The latter slides shown were concerned primarily with the industrial use of radioactive materials, such as in the use of radiation for determining the thickness of rubber and plastic sheets. It was noted that five organizations are using radioactive materials in rubber research and development. The B. F. Goodrich Co., the University of Chicago, E. I. du Pont de Nemours & Co., Inc., the National Bureau of Standards and the U. S. Rubber Co. have received radioactive materials for this purpose.

The materials are being used to measure thickness of rubber films and mercaptans applied to rubber. As elemental sulfur and as organic sulfides, Sulfur 35 is serving as a research tool in studying the chemical mechanism of vulcanization and the growth of polymer molecules in the production of synthetic rubber. Isotopes have been used to evaluate the resistance of synthetic solids, such as rubber and plastic, against abrasion, Dr. Woodruff said.

In his concluding remarks, several other possible radioisotope applications in rubber research were outlined. These included measurement of the temperature stability and rate of ion transport through semi-conductors, determination of the efficiency in mixing various powders, determination of the toxicological properties of various rubber additives, determination of the distribution of additives in rubber, and evaluation of the adhesion and aging of coating agents.

It was pointed out that because of the limited number of industrial research personnel now trained in the specialized techniques for handling and using radioisotopes, very few of the potential industrial applications of radiotracers have been exploited. The variety and number of radioisotope applications in rubber research as well as in other fields of industrial research will certainly expand in the future, according to the speaker.

A booklet designed to remind farmers and farmworkers of some of the causes of premature tire failure, and indicating ways of avoiding them, has been issued by the British Rubber Development Board, London, England, under the title "How the Innocent Suffer."

NEW YORK RUBBER GROUP HOLDS ITS ANNUAL OUTING

Favored with a particularly balmy day, some 160 members and guests attended the 1949 summer outing of the New York Rubber Group at Doerr's Grove in Millburn, N. J., on Thursday, June 16. The outing was marked by greater participation in a larger number of events than at any previous outing of the group. As usual, numerous sports and game events were held during the day, followed by dinner and the distribution of prizes to winning contestants.

Highlites of the afternoon included a softball tournament, between teams composed of "Slaves" and "Peddlers," finally won by the team captained by Frank Cathey, and a tug-of-war contest, honors of which went to a team headed by Pete Murawski (DuPont). Winners of other events included the following:

Egg Throw, V. H. Perrine (Thiokol) and Herman Encke (Bancroft-Hickey); *Fat Men's Race,* Stanley Rutkowski (Sindar); *Shoe Race,* Dick Kriney (Advance Solvents); *Three-Legged Race,* Ray Margles and Mike D'Asaro (Wolff-Alport Chemical); *Basketball Throw,* George Brunt (Flintkote); *Baseball Throw,* Steve Paliska (Pioneer Latex); *Horseshoes,* W. L. Lamela (Okonite), M. R. Buffington (Lea Fabrics); *Darts,* Irving Polhemus (Flintkote), Addison Hubbard (Standard Oil Development).

M. R. Buffington (Lea Fabrics) was chairman of the Outing Committee and C. T. Jansen (RUBBER AGE) acted as master of ceremonies. Those in charge of various events included Bert Wilkes (Herron Bros.), Bob Carroll (R. E. Carroll), W. L. Lamela (Okonite), Harry Eckhardt (Lea Fabrics), George Brunt (Flintkote), and M. E. Lerner (RUBBER AGE).

N. Y. Golf Outing on August 9

Plans have been completed for the annual golf outing of the New York Rubber Group. It will be held on Tuesday, August 9, at the Wingfoot Golf Club in Mamaroneck, N. Y., as in the past, and the course is expected to be in excellent shape since the date falls between the Anderson Memorial Tournament and the Walker Cup matches. Complete details will be sent to members shortly and early reservations are suggested. The Tournament Committee includes E. B. Curtis (Vanderbilt) as chairman, assisted by Jean Nesbit (U.S. Rubber Reclaiming) and Charles W. Haynes (Binney & Smith).

Continental Transfers Units

Transfer of several carbon black producing units from Sunray, Texas, to Eunice, New Mexico, was recently completed by the Contitnental Carbon Co. These producing units in their new location will produce an additional 1,200,000 pounds of channel black a month, company officials stated. This type of black constitutes more than half of the total amount consumed by the rubber industry. Increased production at Eunice will help to meet this demand.

Goodrich Tire Testing Unit

Sometimes referred to by his associates as a "Tire Doctor" the technician of the B. F. Goodrich Co. shown here is taking the temperature of a tire. Measurement of the heat developed in a cas-

ing under controlled conditions is one of the important phases of the continuous testing program, both indoors and out. The tire illustrated here had been revolved by the wheel at the left until conditions of the particular test had been met. All types of tires on the market and those being developed are given these and other tests, and the tire cut apart at their conclusion to see how the trials have been withstood.

ELECTION OF OFFICERS FEATURES ONTARIO ANNUAL SUMMER OUTING

An election of officers for the 1949-50 season featured the annual summer outing of the Ontario Rubber Group held at Rouge Hill Golf and Country Club, Scarboro, Ontario, Canada, on June 11. Officers elected included: *Chairman,* S. M. Murray (Joseph Stokes Rubber); *Secretary-Treasurer,* F. R. Gorrie (Delacour-Gorrie). The following members were elected to the executive committee: E. A. Kent (Canada Wire & Cable); H. Pletch (Goodrich); L. G. Webber (Firestone).

Recreational activities centered about a golf tournament which was followed by a dinner and the presentation of tournament and door prizes. Ross Dennis (Canada Carbon) donated a trophy to the group which is to be put up each year for presentation to the low gross winner. The prize was won this year by William Moncur (Seiberling).

Other prize winners included: *2nd Low Gross,* Carl Croakman (Binney & Smith); *3d Low Gross,* H. M. Payette (Dunlop Tire); *Low Net,* S. M. Murray; *2nd Low Net,* R. Hoddle (Kaufman Rubber); and *3rd Low Net,* J. Noble (H. L. Blachford). Don Walker (Dunlop Tire) and Paul Hooper (H. L. Blachford) served as the outing committee, planning the activities and distributing prizes.

An inner tube, some 35 years old, was recently sent to Goodrich from England. The tube is the 36 x 4 size in wide usage on American automobiles three and a half decades ago and is still capable of holding air.

AKRON RUBBER GROUP OUTING HELD IN INCLEMENT WEATHER

A day long rain which prevented the holding of most of the scheduled contests failed to dampen the spirits of approximately 600 members and guests of the Akron Rubber Group who gathered at the Firestone Country Club, Akron, Ohio, for the annual summer outing on June 17. Although many of the members played golf, the usual prizes were not awarded due to varying conditions which prevailed throughout the day. Soft ball, volley ball and horseshoes also suffered as a result of the weather.

Fishermen members of the group braved the elements. The plug casting tournament which attracted forty entries was won by J. H. Porosky (General Tire), second place was taken by Willard Haas (Goodrich) and third prize was won by H. P. Owen (Goodrich Chemical).

William H. Ayscue (DuPont) was general chairman of the affair. Chairman of subcommittees included: *Golf and Entertainment.* C. N. Lehto (Goodyear); *Food and Location,* L. V. Cooper (Firestone); *Prizes,* C. F. Wimmer (Phillips Chemical); *Tickets,* Roy H. Marston (Binney & Smith); *Solicitation,* E. L. Stangor (DuPont).

Chicago Group Issues Yearbook

The Chicago Rubber Group has published its 1949 Yearbook. Seventy-two pages in size, with a hard cover, it is a considerable improvement over the first yearbook of the group issued in 1945. The current edition contains a complete list of members, by-laws of the group, condensed descriptions of meetings held during the 1948-49 season, and a directory section listing rubber manufacturers in the Chicago area. Some technical data is also presented, including a classification of carbon blacks by types, brand names, manufacturers and uses; a hardness conversion chart; a table giving the capacities of hydraulic rams in tons, and a table showing the properties of various synthetic rubbers. R. G. Penner, of W. H. Salisbury & Co., is secretary-treasurer of the Chicago group.

Southern Ohio Summer Outing

The Southern Ohio Rubber Group held its annual summer outing and golf tournament on June 4 at Edelweiss Park, Dayton, Ohio. Morning activities featured a golf tournament at the Madden Park Golf Course, while afternoon and evening activities saw group members turning out for baseball, softball, horseshoes, volleyball and cards. Picnic lunches were served throughout the afternoon. Many different door prizes were distributed to members and their guests. Winners of the golf tournament included: *Birdies,* Frank F. Woznak (Irvington Varnish), George E. Lange (Premier Rubber), G. R. Overman (Inland Mfg.), Robert B. Sucher (Inland Mfg.), Robert S. Radow (Dayton Rubber); *Low Net,* G. R. Overman; *Low Gross,* Robert B. Sucher and Frank F. Woznak.

PLANNING ASSOCIATION REPORTS ON INDUSTRIAL SHIFT TO SOUTH

The National Planning Association, Washington, D. C., in a recent report on industrial expansion in the south, has attempted to explain why the rubber manufacturing industry has expanded southward from Akron. According to the report, expansion of the rubber industry southward "resulted from the decision of tire producers to divide up the national markets into consuming areas to be supplied from regional plants." These tire companies were after savings in transport on both materials and products in their southern location, the report maintained.

The survey referred specifically to the Goodrich plant at Miami, Okla., the Goodyear plant at Gadsen, Ala., the Firestone plant at Memphis, Tenn., and the General Tire plant at Waco, Texas. Officials of these companies were among those of 88 firms in various industries that have moved southward who were interviewed on the matter.

The three most important reasons for southern expansion, as reported by the association, were good markets, availability of materials and labor supply, in that order. The association found it "surprising" that most of the companies locating plants in the south were not after "cheap labor." Neither were they especially seeking to escape unionism which already had occurred at most of their northern plants. Most of the companies considered eventual unionization of their southern plants inevitable, the report said.

The report points out that three essential ingredients of tire production—textiles, carbon black and synthetic rubber—are all produced in the south. In inviting tire manufacturers to locate their plants in the south, the various localities have pointed out that freight costs on raw materials to Akron could readily be saved. They also stressed that making tires in the south eliminates the extra freight expense of shipping finished tires back to southern consumers. The report indicates that tire companies were influenced by all of these considerations in their decisions to establish plants in the south and southwest.

The report cited Goodrich as an example of how deliberately a rubber company selects a southern or southwestern location. Goodrich's selection of the Miami, Okla., site in 1945, according to the NPA report, occurred in this manner:

Goodrich decided that one-fourth of its tire business could be served from a location south of Kansas City and west of the Mississippi River. Demand was largely for tire replacements for automobiles and farm equipment. The company studied 90 possible locations, of which 64 were eliminated for lack of sufficient ground water for cooling. Another 14 were found to be scarce of power and fuel resources.

Of the remaining 12, nine were deemed to lack adequate rail and highway service. Miami was selected from the last three because it had a better labor supply than the first of the other two and afforded more speed in service to customers than the second.

Hoover Expands Facilities

New and enlarged facilities for continuing research work on rubber and plastic applications are being installed in the Engineering Department of the Hoover Co. at North Canton, Ohio. Experimental and development work now being carried on in different plant locations will be consolidated and centered in a single area, the company said. The new laboratory will house rubber and plastics equipment, including mill, calender, compression and injection molding presses, extrusion and high frequency equipment, and complete testing equipment. In addition to research and development work, the new laboratory will be used as a center for quality control of rubber and plastic materials used in electric cleaners, electric irons and fractional horsepower motors.

Tire Prices Reduced 5 to 7½%

Following the lead set by the Standard Oil Co. of Ohio, tire manufacturers have reduced the prices of first line and premium tires by 5 to 7½%. Standard had reduced the price of its Atlas passenger car tires by 19%, which brought the price of Atlas tires to $12.92 for the 6:00 x 16 size. New prices established by tire producers such as Firestone, Goodyear, Goodrich, U. S. Rubber and General Tire, saw the 6:00 x 16 selling for $14.75. The differential between this price and that set by Standard is about the same as existed between the brands before the war. Prices for inner tubes also dropped. Most companies, however, did not drop prices on second and third line tires, and some, like Firestone, made no price changes in premium lines.

Brazilian Award for Litchfield

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co., was awarded the Order of the Cruzeiro do Sul by the Brazilian Government at special ceremonies in the presidential palace in Rio de Janeiro on June 17. The award, the highest that the Brazilian nation can bestow on a foreigner, was conferred upon Mr. Litchfield for his outstanding contributions to the economic welfare and development of Brazil. Mr. Litchfield and several other Goodyear executives left the United States on June 5 for an inspection tour of the company's South American plants, one of which is the factory at Sao Paulo, Brazil. Goodyear also has offices and a distribution center for its products at Rio de Janeiro.

Adopt "Elastex" Trade Name

For convenience and easy identification the name of "Elastex" has been adopted for its line of plasticizers by the Barrett Division of Allied Chemical & Dye Corp., New York. In the future, the company's dicyclohexyl phthalate will be known as Elastex DCHP and diisooctyl phthalate as Elastex 10-P. Barrett 50-B Plasticizer will be known as Elastex 50-B Plasticizer.

PASSENGER CASING SHIPMENTS IN MAY 5% OVER APRIL TOTALS

Manufacturers' shipments of passenger casings during May totaled 5,908,666 units, an increase of 4.27% over April when 5,666,650 casings were shipped, according to the Rubber Manufacturers Association. Truck and bus casings shipped during May totaled 915,037 units, 3.08% less than the 944,093 units shipped in April. Total automotive casings shipped during May amounted to 6,823,703, 3.22% more than the 6,610,743 units shipped in the month of April.

A total of 6,934,326 automotive casings were produced during May, .36% less than the 6,959,315 casings produced during April. Of the May totals, 5,980,837 were passenger casings, and 953,489 were truck and bus casings, against the 5,939,645 passenger casings and 1,019,670 truck and bus casings produced during April.

Inventories of automotive casings at the end of May amounted to 13,301,203 units on hand, of which 10,769,289 were passenger casings and 2,531,914 were truck and bus casings. At the end of April, 13,190,605 automotive casings were on hand, of which 10,705,291 were passenger casings and 2,485,314 were truck and bus casings.

Passenger and truck and bus tubes produced during May totaled 6,088,164 units, compared with the 6,058,992 produced during April. Tubes shipped during May amounted to 5,296,063 units, against 5,396,411 units for April. Inventory of tubes at the end of May showed 12,410,463 units on hand, compared with the 11,747,607 tubes on hand at the end of the preceding month.

Consolidate Manufacturing Units

Consolidation of the tire and tube manufacturing facilities of the Pennsylvania Rubber Co., Jeanette, Penna., with those of the Mansfield Tire & Rubber Co., Mansfield, Ohio, was recently announced by H. B. Soulen, president of the Mansfield company, and Gordon H. Groth, vice-president and general manager of the Pennsylvania company. The consolidation, effective July 1, follows several months of negotiations, and will bring Pennsylvania's tire production to the Mansfield plant. Sales policies for distribution of both the Mansfield brands and the Pennsylvania brands will remain unchanged. Pennsylvanai Rubber will continue to manufacture its line of athletic goods at Jeannette, and has plans under consideration for manufacturing additional products there. Both Pennsylvania Rubber and Mansfield Tire are affiliated with the General Tire & Rubber Co.

Rotex Official in Europe

Jakob Hirschberger, president of the Rotex Rubber Co., of Newark, N. J., is currently in Frankfort, Germany, in connection with the firm's business. This is only one of many stops in a trip planned to cover all of the rubber centers in Western Europe. The Rotex concern does a large volume of export business in rubber, vinyl and polyethylene scrap.

FLEXIBLE TUBS BY GENERAL TIRE FEATURE NEW BENDIX WASHERS

General Tire & Rubber Co., Akron, Ohio, in cooperation with Bendix Home Appliances, Inc., South Bend, Ind., has developed a new flexible tub for inclusion in the new Bendix Economat automatic washing machine. Idea for the washer was conceived several years ago by James H. Rand, youthful Cleveland, Ohio, inventor. His plan called for the squeezing of water out of the clothes. This, however, called for a flexible tub.

At a reported $500,000 purchase price, Bendix acquired the rights to the idea. Mr. Rand also receives a royalty on every machine made on this principle for the next twenty years. Upon acquiring rights to the idea, Bendix began planning production. Engineers from the Mechanical Goods Division of the General Tire & Rubber Co. were given the assignment of developing a method of producing the tub in one piece, and perfecting a material with the proper abrasion resisting qualities.

Development of "Metexoloy"

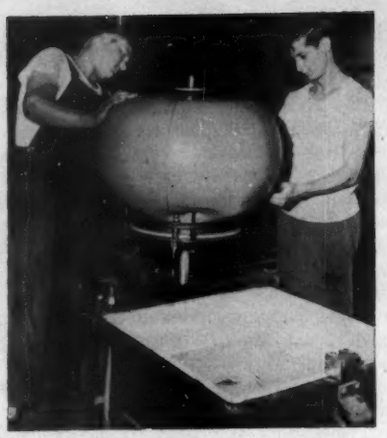
The material decided upon was a compound of rubber, chemicals and metal, called "metexoloy." During the war, this rubber-like material had gained a reputation through its use in tank tracks. In early developments, the tub was spliced and made in sections. General's engineers finally developed a process for fully molding the tub in one piece.

One of the first problems was to devise a means of removing the newly formed tubs from the steel molds since both the top and bottom openings were much smaller than the middle section. General's engineers tailor-made their own mold for this job—said to be the largest of its kind in the world. Altogether, more than $2,500,000 and more than two years were spent in perfecting the Economat, and much of the time and money was spent in the development of this 75,000-pound mold.

The new washer is a fully-automatic agitator type, top-loading washer. The triple-action tub, called "Wondertub," secret of the Economat, moves and works. Improved agitator action washes the clothes. Then the "Wondertub," under vacuum pressure, squeezes in to force dirty suds and dirty water down the hollow agitator. Then the tub rinses twice in clean, warm water. Finally, the "Wondertub" gently but firmly closes in again, under vacuum pressure, hugging the fabric until excess water is removed.

"Metexoloy" Formula Secret

The "metexoloy" formula is not being made public, but engineers of General Tire have test-proven the material to be more resistant to abrasion than either steel or aluminum. The tub is guaranteed for five years. Full production is being obtained on the tubs at the Wabash, Ind., plant of General Tire. The giant molds produce four tubs per cure, with production on a three-shift basis.



After the "metexoloy" tubs are removed from the steel molds by a patented process, they are made ready for the Bendix Economat with a series of tests. Here the tubs are fitted to a device and inflated and then tested in water for leaks.

A giant mold, largest of its kind in the world, produces a one-piece "Wondertub" at the Wabash, Ind. plant of the General Tire & Rubber Co. The light gray, rubber-like tubs are shown on molds as they come out of the press where they are formed and vulcanized.

New Home for Bardon Rubber

Bardon Rubber Products Co. has announced that work has started on their new factory building at Union Grove, Wisc. Bardon Rubber was previously located in Somers, Wis. A fire last May completely destroyed the plant and equipment of the company. The new building at Union Grove will be 62 by 92 feet, of cement block construction, and will be of fireproof construction throughout. Company officials state that the plant will be in production on or about August 29, and will employ approximately 25 persons at the outset. Donald J. Rasor is president of the company.

Silastic 250 Silicone Rubber

Dow Corning Corp., Midland, Mich., has announced production of Silastic 250, claimed to be the toughest, most stable silicone rubber ever made. Silastic 250 has a temperature range of from 500° F. to —130° F. In this span of 630° F., the product is said to have greater tensile strength, greater tear resistance, greater elongation and better electrical properties than any other rubber-like material. The dielectric strength of Silastic 250 is 700 to 900 volts per mil, while the dielectric constant at 100 cycles per second is 3.1, and at 1,000,000 cycles per second it is 3.0. The power factor of the product at 100 cycles per second is 0.2%, while at 1,000,000 cycles per second it is 0.8%. These developments offer new applications in the automotive, aircraft, process and electrical industries.

Chemical Industries Exposition

Organization of the 22nd Exposition of Chemical Industries has been completed on a scale rivaling any previous enterprise of its kind, and announcement has been made that the exposition will be held in Grand Central Palace, New York, N. Y., from November 28 to December 3, 1949. Exhibits will be composed of raw materials, machinery and products covering every recognized industrial and commercial application of chemical materials. The exposition is under the management of the International Exposition Co.

Armour Chemical Eastern Office

The Armour Chemical Division of Armour & Co., Chicago 9, Ill., has established an Eastern Sales and Technical Service Office in the Armour company offices at 120 Broadway, New York 5, N. Y. The new office will be under the supervision of Ervin W. Segebrecht. The telephone number for the office is REctor 2-5600.

Ohio Rubber Interests Sold

Agreements have been signed for the sale of assets of the Ohio Rubber Co., Willoughby, Ohio, to a new company financed by the management of the present company and a group of investors in New York City, Philadelphia, Penna., and St. Louis, Mo., according to a recent statement by Franklin G. Smith, president of the company. The price was reported to be $6,000,000. There will be no change in the name, business, policies or management of the company. Ohio Rubber has a management group which has agreed to purchase a substantial amount of the securities of the new company, the Ohio Rubber Co. of Delaware, thus insuring the continuity of management and business. Additional capital is being supplied by the investment firms of Payson & Trask, New York City, Butcher & Sherman of Philadelphia, and Smith, Moore & Co., St. Louis, Mo., and some individuals. The sale was brought about when heirs of the $12,600,000 estate of the late A. C. Ernst, managing partner in the accounting firm of Ernst & Ernst, deemed it advisable to convert the Ernst holdings in Ohio Rubber into cash. The company has been doing a business of approximately $15,000,000 annually. It has 1,400 employees and plants in Willoughby, Conneautville, Penna., and Long Beach, Calif.

Rubber Consumption for May

New rubber consumption for May was estimated at 81,028 long tons by the Rubber Manufacturers Association in its regular monthly report. This compares with 84,206 tons in April and amounts to a reduction of 3.78%. Natural rubber consumption during the month was down 3.97% to 45,710 long tons as against 47,600 tons the previous month. Synthetic rubber consumption was down 3.52% for the same period to 35,318 tons as compared with 36,606 tons consumed in April. Consumption of reclaimed rubber was estimated at 17,923 long tons in May as compared with 18,625 tons in April, a drop of 3.77%.

Boosts Topeka Plant Capacity

Goodyear Tire & Rubber Co. has announced plans for a 25% increase in productive capacity at its Topeka, Kansas, plant. Present production at the plant is approximately 7,000 tires daily. Equipment is now being installed to increase the daily number of tires as well as to increase the number of types and sizes manufactured. According to the company, the installation of equipment will be completed about September 1.

Disposal of Andal Mfg. Co.

The Andal Manufacturing Co., producers of metal doorway canopies, awnings, shutters, and other building specialties, has been purchased by the Falls Stamping & Welding Co., of Cuyahoga Falls, Ohio. The concern was previously owned by the Andrews-Alderfer Processing Co. of Akron. Andal operations will continue to function as a division of the Falls Stamping concern.

LABOR NOTES

Protesting the company's intention "to increase the work a man has to do in order to make the same amount of money," some 300 employees quit work at the Goodrich plant at Miami, Okla., on June 29. The company charged the walkout as being in direct violation of the contract with the union.

The forty-three day strike at the Dryden Rubber plant in Chicago was ended on June 30. In accepting the company's terms for ending the strike the union agreed to dismissal of its president and four others who had been arrested for sluggings and picket line clashes. The agreement also continues in effect the old contract without wage alterations for 18 months.

The National Labor Relations Board disclosed on June 3 that employees of the Swan Rubber Co. at Bucyrus, Ohio, had voted against the U.R.W.A. as bargaining agent. The vote was 175 to 93.

In the face of stiff opposition from the "Big Four," the U.R.W.A. has overhauled its bargaining machinery for company-wide negotiations. Top officers of the international union have withdrawn from contract talks and have lined up four teams of experienced negotiators. Union officers will not participate in the discussions "unless absolutely necessary."

One of the shortest strikes on record in the Akron area occurred last month. About 220 employees of the Akron Standard Mold Co. went back on the job on June 15 after accepting a five-cent-an-hour increase. Unable to agree on the increase, the workers walked off the job at 2:30 P.M. and returned an hour and a half later.

Negotiations between the U.R.W.A. and the Goodrich management, which started in Chicago two months ago, have been indefinitely postponed. Negotiations with Goodyear on a company-wide basis are scheduled to start an August 1, with Firestone talks to begin on September 15. The union is seeking a 25-cent-an-hour increase and company-financed pension plans.

Norwich Receives Cabot Donation

Godfrey L. Cabot, president of Godfrey L. Cabot, Inc., Boston 10, Mass., has presented Norwich University, Northfield, Vt., with a gift of more than $500,000 for the support of a program of training in aviation and the construction of a science building. Dr. Cabot is a former president of the National Aeronautic Association and honorary president of the Federation Aeronautique Internationale. He has been a Norwich trustee since 1934. A year after his election as a trustee, Dr. Cabot gave Norwich several hundred thousand dollars to establish a professorship for the study of air transportation. To his original gift, he has added funds which now make a total conservatively estimated to be well in excess of $1,000,000.

URW Asks U.S. Employment Aid

The United Rubber Workers (CIO) recently asked employers and the Government to stop unemployment in the rubber industry, in a statement issued from a special meeting of the executive board held in Akron, Ohio. More than 50,000 rubber workers were laid off in the last year, the union said. The union asked employers to grant the 1949 URW contract demands for 25 cent per hour wage boosts and $100 a month employer-financed pensions, as well as the extension of the 6-hour day throughout the industry with no reduction in pay and the elimination of area pay differentials. The union urged the Government to enact the Brannan farm program; start emergency public works programs; adjust the Federal tax structure "to shift the burden from lower income groups"; increase unemployment insurance benefits; raise the minimum wage from 40 cents an hour to $1, and cut the work week in the rubber industry from 40 to 30 hours.

New Form of Calcined Magnesia

General Magnesite & Magnesia Co., Plymouth Meeting, Penna., has made available calcined magnesia in lump form, packaged in heat-sealed polyethylene bags for protection from moisture and carbon dioxide. The magnesia in this form is said to reach the user with its properties as a scorch resisting material in neoprene undiminished. According to the company, the fact that the material is in lumps instead of in powder form does not retard the rate of cure. The mixing stresses in Banbury mixers and on rubber mills are so great that the very fragile lumps are completely pulverized and dispersion in the rubber is at least equal to that of any powdered magnesia.

New DuPont Research Laboratory

E. I. du Pont de Nemours & Co., Inc., has announced plans to build a $2,000,000 research laboratory in Philadelphia, Penna. Plans call for the laboratory to be ready for occupancy late in 1950. James C. Bullitt, director of the laboratory, said the new building program "reflects the decision of the DuPont company to expand and improve its facilities for research and development in the field of paints, varnishes, enamels, synthetic resins and other finishing materials." The new laboratory will also be available for users of DuPont finishes who desire to solve actual production problems, or try new finishing recommendations, the company said.

Truck and Bus Tire Prices Cut

Following recent price cuts in passenger tire lines, a general price reduction of from 5 to 7½% has been placed into effect for truck and bus tires and tubes manufactured by major companies. At this writing, Goodyear, U. S. Rubber, General Tire, Seiberling, and several smaller firms have instituted price cuts. While some of the companies limited their reductions to other than premier lines, it is generally felt that the reductions in prices will be standard throughout the industry.

NAMES IN THE NEWS

RICHARD G. KADESCH, associated with the Reynolds Metals Co. for the past few years, has joined Emery Industries, Inc., Cincinnati, Ohio, as research director.

EVERETT S. BISSELL, formerly vice-president and general manager of the Mixing Equipment Co., has been named vice-president in charge of sales, research laboratories, chemical engineering and process engineering of the Patterson Foundry & Machine Co., East Liverpool, Ohio.

FRANK R. MAYO, of the U. S. Rubber Co., Passaic, has been elected chairman of the North Jersey Section of the American Chemical Society. George N. Vacca, of the Bell Telephone Laboratories, is treasurer.

GEORGE W. RUSSELL, assistant sales manager of the Industrial Chemicals Division of American Cyanamid Co., has been elected president of the Chemical Market Research Association.

PAUL E. GLEICHAUF, since 1945 manager of the Tire Department of the Goodyear Tire & Rubber Export Co., was recently honored upon completion of his 35th year of service with the company.

DR. LOWELL B. KILGORE, formerly an industrial research fellow in the Department of Agriculture, has been appointed acting chief of the Chemicals Division, Department of Commerce, succeeding FREDERIC ARDEN, who has returned to private industry.

J. R. BROCK, member of the Purchasing Division of the Mohawk Rubber Co., has been elected president of the Purchasing Agents Association of Akron, Ohio.

WILLIAM H. ABERNATHY, previously associated with the research laboratories of the Goodyear Tire & Rubber Co., and with the Southern Research Institute, has been named special representative of the Chemical Division of Goodyear with headquarters in Birmingham, Ala.

ARTHUR B. MULLALY, associated with the Advance Solvents & Chemical Corp., New York, for the past several years, has been elected president of the company succeeding his father, the late Arthur L. Mullaly.

FELIX YERZLEY, well-known rubber chemist and physicist, has joined L. E. Waterman & Co., New York, in an executive capacity.

E. GAUDETTE, until recently assistant plant manager of the Rome, N. Y., plant of the General Cable Corp., has been transferred to New York to suceed E. L. ADAMS as assistant to the director of purchases of the company. Mr. Adams retired as of June 15.

LINCOLN T. WORK, formerly associated with the Metal & Thermit Corp., has joined the Powdered Material Research Laboratories, Cambridge 39, Mass.

GEORGE KIRLIN, associated with the wire and cable industry for some thirty-five years, has been named a vice-president of the Canada Wire & Cable Co., Ltd., Leaside, Ontario, Canada.

WINTON SLADE, formerly associated with the Robbins Tire & Rubber Co., has joined the Fremont Rubber Co., Fremont, Ohio, as a rubber chemist.

T. W. FAZAKERLEY, associated with P. B. Cow & Co., Ltd., England, for the past twenty years, has resigned his position as director and general manager of the company.

WARREN M. PIKE, long associated with the sales engineering field, has been named New England representative of the Farrel-Birmingham Co., Inc., to handle the sale of gears and gear units manufactured at the company's Buffalo, N. Y., plant. He will have headquarters in Boston.

ARTHUR L. METZGER, formerly sales manager of the plastics division of the Meyer & Brown Corp., has joined the A. Bamberger Corp., Brooklyn, N. Y., in charge of the Elastomeric Division.

FRED J. KELLY, formerly sales manager of the American Brakeblok Division of the American Brake Shoe Co., has joined the Thermoid Co., Trenton, N. J., as special account executive, working with the president.

WILLIAM VINCENT, plant manager of the Rome, N. Y., plant of the General Cable Corp., has been transferred to the St. Louis, Mo., plant, whil J. T. DUGALL, of the St. Louis plant has been transferred to Rome.

E. M. CABANISS, for many years executive vice-president of the Joseph Dixon Crucible Co., has been elected president of that company, succeeding J. H. SCHERMERHORN, who becomes chairman of the board.

WILLIAM T. HUNTER, vice-president of the Scovill Manufacturing Co. and president of A. Schrader's Son, Inc., recently completed his 50th year with the Schrader organization. He received a 50-year service award and pin at a special buffet luncheon.

ROBERT L. RICHARDS, who started with the DuPont organization as an operator at the Buffalo plant in 1923, has been named general manager of the company's rayon department. He succeeds BENJAMIN M. MAY, who has retired after more than 46 years with the company.

BRADLEY DEWEY, president of the Dewey and Almy Chemical Co., Cambridge, Mass., has been named a trustee of the American Optical Co.

E. GAUDETTE, formerly assistant plant manager of the Rome, N. Y., plant of the General Cable Corp., has been transferred to the New York office where he will act as an assistant to the director of purchases. He succeeds E. L. ADAMS, who has retired.

E. A. WILLSON, associated with the B. F. Goodrich Research Laboratory, has been elected chairman of the Akron Section of the American Chemical Society for the 1949-50 season.

FRED L. FORD, formerly associated with coated fabrics activities of the Atlas Powder Co., has been appointed director of sales for the Athol Manufacturing Co., Athol, Mass. He will make his headquarters in New York City.

WESTERN WILES, sales manager of the Faultless Rubber Co., Ashland, Ohio, for the past 18 years, has been elected vice-president in charge of sales for that company.

J. D. "JOE" ZELLER, formerly technical sales representative of Godfrey L. Cabot, Inc., is now associated with the Armstrong Tire & Rubber Co., in Natchez, Miss.

ROBERT IREDELL, director of engineering of the General Tire & Rubber Co., has been named a director of the Akron (Ohio) Hospital Service.

M. H. LEONARD, formerly chief chemist of the Buenos Aires plant of the Firestone Tire & Rubber Co., has been appointed technical service representative in the Akron office of the Binney & Smith Co.

Leeds & Northrup 50th Birthday

To celebrate the beginning of its 50th anniversary, the Leeds & Northrup Co., Philadelphia, Penna., played host to 3,200 employees and their guests at a dinner, entertainment and dance tendered at Convention Hall in Philadelphia on June 4. Immediately after dinner, C. S. Redding, president of the company, greeted the assemblage on behalf of the company. In his address he paid tribute to Morris Evans Leeds, founder of the company and now chairman of the board. Mr. Leeds was presented with a gold 50-year service plaque and a testimonial expressing the organization's esteem for its founder.

A technical bulletin covering the application of Indonex plasticizers in low temperature GR-S compounds has been made available by the Indoil Chemical Co., Chicago. Ask for Circular No. 13-33.

Farrel-Birmingham Co., Inc., recently announced that C. A. Lapp & Co., of Cleveland, will handle the sale of Farrel gears and gear units in the Cleveland area.

FURNEX

offers...
AN IDEAL BALANCE
OF TENSILE, MODULUS
AND RESILIENCE plus
LOW VOLUME COST

3

FURNEX standard
FURNEX-HB soft processing
FURNEX-NS non-staining

COLUMBIAN CARBON COMPANY

500 TONS OF SMOKE A DAY

A COLUMBIAN COLLOID

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

MPC (Medium Processing Channel)
STANDARD MICRONEX

◆

EPC (Easy Processing Channel)
MICRONEX W-6

◆

VFF (Very Fine Furnace)
STATEX-K

◆

FF (Fine Furnace)
STATEX-B

◆

FEF (Fast Extruding Furnace)
STATEX-M

◆

HMF (High Modulus Furnace)
STATEX-93

◆

SRF (Semi-Reinforcing Furnace)
FURNEX

◆

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those in our previous issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue. Normally, experimental polymers will be produced only at the request of the consumers and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside if possible for distribution to other interested companies for their evaluation. The 20 bales when available will be distributed in quaitities of one or two bales upon request to the Sales Division of Rubber Reserve or will be held for six months after the experimental polymer was produced unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received to warrant them.

X Number	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*
X-523 GR-S Latex	Firestone, Akron	3-23-49	Same as Type II GR-S Latex except stabilized by the addition of ammonia. pH 10.0-11.0.
X-524	Canceled		
X-525 GR-S	Goodyear, Torrance	3-24-49	GR-S-AC made in standard plant equipment. Mooney viscosity 55 ± 4.
X-526	Canceled		
X-527 GR-S	U. S. Rubber, Borger	4-11-49	Mixture of 55 parts Philblack O, 1 part RPA No. 3 and 100 parts of GR-S polymerized at reduced reaction temperature and shortstopped with ditertiary butyl hydroquinone. Marasperse used as the emulsifying agent in carbon black slurry make-up. Mooney viscosity of Latex 50. Stabilized with 1.5% BLE.
X-528 GR-S-SP	U. S. Rubber, Naugatuck	4-20-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with potassium oleate. Shortstopped with ditertiary butyl hydroquinone. Mooney viscosity 55 ± 5; stabilized with 1.25% BLE. Polymer coagulated by dilute alum-dilute latex technique.
X-529 GR-S	Goodyear, Houston	4-21-49	A mixture of 50 parts EPC black and 100 parts of low viscosity GR-S containing 1.5 parts PBNA. Sodium lignin sulfonate type emulsifying agent used in preparation of carbon black slurry. Mooney viscosity of contained polymer 37 ± 4.
X-530 GR-S-SP	U. S. Rubber, Naugatuck	4-21-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with potassium oleate. Shortstopped with ditertiary butyl hydroquinone. Mooney viscosity 55 ± 5; stabilized with 1.25% BLE.
X-531 GR-S	U. S. Rubber, Borger	4-24-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with Dresinate 731. Shortstopped with dinitro chlorobenzene and hydroquinone. Mooney viscosity 50 ± 7; stabilized with 1.25% BLE.
X-532 GR-S	U. S. Rubber, Borger	4-29-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with Dresinate 731. Shortstopped with dinitro chlorobenzene and hydroquinone. Mooney viscosity 60 ± 5; stabilized with 1.25% BLE.
X-533 GR-S	U. S. Rubber, Borger	4-29-49	Mixture of 55 parts Philblack O and 100 parts of GR-S polymerized at reduced reaction temperature and shortstopped with dinitro chlorobenzene and hydrobenzene. Marasperse used as emulsifying agent in carbon black slurry make-up. Mooney viscosity of the latex, 50. Stabilized with 1.5% BLE.
X-534 GR-S Latex	U. S. Rubber, Naugatuck	5-5-49	Polybutadiene latex shortstopped with tetramethyl-thiuram disulfide. Total solids 30 ± 2. pH 11.0-12.0. Residual styrene 0.05% max. Mooney viscosity of contained polymer 93 minimum (MS 4 at 212° F.).
X-535 GR-S	Goodyear, Torrance	5-4-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with potassium-ORR soap and Dresinate #214. Shortstopped with dinitro chlorobenzene. Mooney viscosity 55 ± 5. Stabilized with 1.25% PBNA.
X-536 GR-S	U. S. Rubber, Borger	5-9-49	Mixture of 55 parts Statex K and 100 parts of GR-S similar to X-478 GR-S. Marasperse used as emulsifying agent in the black slurry make-up. Mooney viscosity of the latex 55; antioxidant 1.5% BLE.
X-537 GR-S	U. S. Rubber, Borger	5-19-49	Mixture of 55 parts Philblack O and 100 parts of GR-S polymerized at reduced reaction temperature, and shortstopped with dinitro chlorobenzene. Mooney viscosity of the latex 50. Stabilized with 1.5% BLE. Marasperse used as emulsifying agent in carbon-black slurry make-up.
X-538 GR-S-SP	U. S. Rubber, Naugatuck	5-19-49	GR-S polymerized at reduced reaction temperature with cumene hydroperoxide activated recipe emulsified with Dresinate 731. Shortstopped with ditertiary butyl hydroquinone. Mooney viscosity 100 ± 10. Stabilized with 1.25% BLE.

NOTE: The above new polymers are experimental only and the Office of Rubber Reserve, Reconstruction Finance Corporation, does not make any representations or warranties of any kind, express or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

EXPERIMENTS IN RUBBER ROAD SURFACING MATERIALS ACCELERATED

In accordance with the general interest evidenced in rubber road surfacing, the State of Ohio has undertaken to construct an experimental strip outside of Akron utilizing powdered synthetic rubber. In addition, and by way of comparison, natural rubber and reclaimed rubber are also being used, the three being employed in different sections of the test strip.

The Akron project is one of three presently being carried out in this country. Test strips have already been laid in Virginia, while the Texas State Highway Department had expected to finish a mile-long experimental strip in the early part of July. Test strips are also to be laid in Minnesota, and several other states have expressed interest in the idea.

The British Rubber Development Board, its American agency, the Rubber Development Bureau of Washington, D. C., and the Dutch Rubber Foundation have lent impetus to the programs in an effort to discover new markets for natural rubber. Use of powdered rubber was first started in Holland and Java about ten years ago. Roads constructed at that time are reported to still be in good condition.

The first road was laid in Virginia outside of Richmond on Route 250. A stretch of 1,000 feet with a surface top dressing containing natural rubber was put down, plus a control stretch of 1,000 feet not containing rubber. The surface dressing consisted of a one-half inch thick layer of asphalt and powdered rubber. The Texas test strip employs a similar compound on a one-mile test strip laid down outside of San Antonio. This stretch of road will carry a traffic load of 8,000 to 10,000 vehicles daily, 30% of them trucks.

Akron Test Procedures

For the Akron tests, finely ground common slag mixed with rubber was spread approximately one-eighth to one-quarter inch thick on a section of Route 18 just east of Tallmadge, Ohio. Synthetic rubber furnished by the Goodyear Tire & Rubber Co. was used in the tests. When spread on the highway, the new mixture forms a slightly abrasive surface, believed just rough enough to permit vehicles to stop suddenly without skidding.

Material on the test project was distributed on the road from a truck equipped with an automatic spreader. Prior to this, the pavement was given an asphalt emulsion treatment to aid adhesion. After slag was spread, a tractor followed in the wake of the truck dragging a section of wire fencing which smoothed out the freshly-laid surface.

According to Ohio State Highway Department engineers, 12 pounds of rubber were mixed with each batch of slag spread. It was further stated that this was the first time the department has tested sand-slag for this purpose, a much higher priced material having been previously used. The lower cost of the slag should make it a much more practical surface, they said.

Goodyear research men were frequently consulted on the experiment. Last fall, a section of Exchange street in Akron had been resurfaced with asphalt containing from 5 to 10% synthetic rubber supplied by the company. This was said to be one of the first times that such a mixture for paving was ever used.

Enters Fashion Textile Field

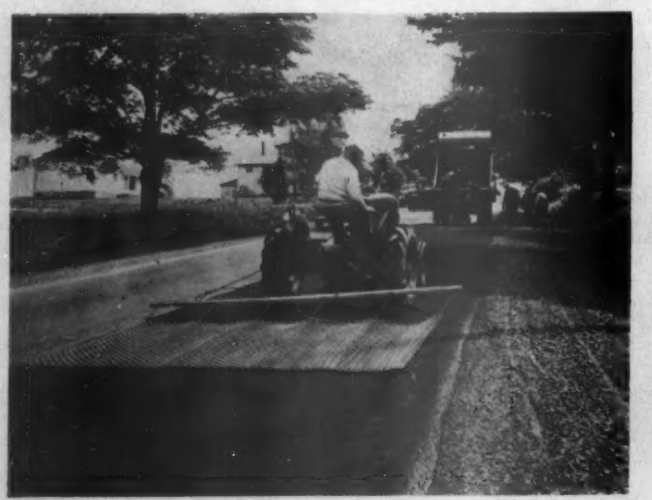
The U. S. Rubber Co. has entered into the fashion textile field with the introduction of Rubiyarn Gingham, first of a line of fabrics to be marketed under the general name of U. S. Royal Fabrics. Textiles for apparel are produced under the company's Textile Division. Sales offices for U. S. Royal Fabrics are located at 40 Worth St., New York, N. Y.

Solvopruf Self-Curing Compound

A new material which can be used as either an adhesive or finish for corkboard or cork covering to prevent damage to the insulation from solvent products has been developed by the Armstrong Cork Co., Lancaster, Penna. The new product, called Solvopruf, is a self-curing compound which may be applied by brush or trowel. It sets to a rubber-like film at room temperature and remains in this condition when exposed to temperature ranges from 35° to 125° F. Upon aging six to seven days, it is resistant to the action of gasoline, kerosene, and water. Solvopruf is manufactured for shipment immediately prior to application. It is not to be stored, and is recommended for use only with cork board or uncoated cork covering since the solvent in the material will soften asphalt products. It is mixed for application on the job. The mix will remain in a fluid condition at normal temperatures for approximately two hours and must be used within this period.

Stitching Rubber to Aluminum

Bardell & McAlister, Inc., Burbank, Calif., reports that it saved time, money and materials in attaching rubber feet to aluminum ladder legs through the use of an Acme-Morrison Metal Stitcher. According to the company, it realized a saving of approximately two minutes' assembly labor per ladder over the previous method of bolting; a saving of the cost of four screws, nuts and washers, and in increase in the strength and rigidity of the joint. In a single operation, the Acme-Morrison stitching unit forms its own stitch (or staple), drives it through the terial and clinches it. In this particular case, the stitch penetrated ¼ inch of rubber and 3/32 inch of aluminum. The Acme-Morrison unit is a product of the Stitching Wire Division of the Acme Steel Co., Chicago 8, Ill.



Depicted above is a portion of the experimental strip laid down near Akron, Ohio. The truck shown in the foreground is spreading the fine slag which has been mixed with powdered rubber. The tractor in the photograph follows close behind dragging a section of wire fencing which helps to smooth out the new material.

This experimental strip near Richmond, Virginia, was top-surfaced with a dressing containing powdered natural rubber. It is a three-lane highway and a 10-foot lane was put down on each of three days to complete the 30-foot wide road. The photograph depicts the start of the second laying paving. The surface dressing put down was one-half inch thick.

Monoplex DOA Now Available

Commercial availability of Monoplex DOA (di-iso-octyl adipate), a monomeric plasticizer of unusual efficiency, has been announced by the Resinous Products Division of the Rohm & Haas Co., Philadelphia, Penna. Produced as a distilled ester of high purity and excellent color, it is said to function well as a plasticizer for light and heavy weight vinyl film, supported and unsupported, for organosol and plastisol compounds, for molded and extruded vinyl stocks, and as a modifier for vinyl emulsions. According to the manufacturer, Monoplex DOA imparts outstanding low temperature flexibility (Kemp bend-brittle temperature, —63° C.), hand and drape, and produces films of good color, clarity, stability to ultraviolet light and resistance to water extraction. The plasticizer is also an efficient modifier for blending with resinous plasticizers of the Paraplex family, where improved flexibility and softness at low temperatures are desired.

Dyphos Vinyl Plastic Stabilizer

National Lead Co., New York 6, N. Y., has developed a new type stabilizer for vinyl plastics called Dyphos. Laboratory and outdoor exposure tests are said to show that Dyphos-stabilized plastic compounds have at least twice the life of similar compounds stabilized by other means. Dyphos, the dibasic lead salt of phosphorus acid, is an antioxidant stabilizer with high heat and light stability, coupled with excellent electrical properties. The product does not change color in use and its breakdown products as well as Dyphos itself are insoluble in water or organic solvents. Technical bulletins on the new stabilizer may be secured from the National Lead Co. Research Laboratories, 105 York St., Brooklyn, N. Y.

Kralac High Styrene Resin

Naugatuck Chemical Division of the U. S. Rubber Co., New York 20, N. Y., has developed a new high-styrene copolymer resin for the general improvement of natural and synthetic rubber products. Known as Kralac A, the resin is said to increase hardness without excessive pigment loadings and loss of physical properties. Use of Kralac A will also improve abrasion without lowering flex-cracking resistance. The product finds use in the production of "hard rubber" type stocks, soles and heels, tiling or decorative panels, mechanical goods, footwear parts, etc.

Tyer Rubber Personnel Changes

W. W. Killion, assistant sales manager of the Tyer Rubber Co., Andover, Mass., has reported that John E. Sutherland, formerly in charge of extruded rubber goods development at the Muncie, Ind., plant of the Goodyear Tire & Rubber Co., has joined the Tyer organization. Mr. Killion joined Tyer in April, 1948, after 15 years with Goodyear in the sale of industrial molded goods.

Goodrich Chemical Names Osborne

E. B. Osborne

E. B. Osborne has been named sales representative for Geon plastic materials by the B. F. Goodrich Chemical Co., Cleveland, Ohio. Mr. Osborne is a graduate of Illinois College with a B.A. in chemistry and holds an M.S. in chemistry from the university of Wisconsin. He joined the B.F. Goodrich Co. in 1943 and for the past six years has been engaged in research and technical service work. Mr. Osborne is a member of the American Chemical Society and T.A.P.P.I. His territory will include Philadelphia, Penna., and adjacent areas.

Goodyear 2 Mil Vinyl Film

The General Products Division of the Goodyear Tire & Rubber Co., Akron, Ohio, has announced production of a new 2 mil vinyl film produced in a great variety of transluscent and opaque colors. This soft, thin and fadeproof film supplements Goodyear's production of 4, 5 and 6 mil films. Unlike the heavier material which is produced on calenders, the new film is manufactured on two newly-installed casting units. The process involves the spreading of a vinyl resin solution on an endless belt; the solvents being driven off; the resultant product being a film of accurately-controlled thickness, free of "pinholes." The film has passed SPI non-inflammability specifications. Accelerated and simulated sunlight tests to determine color fastness show the film standing as much as 30 hours in a fadeometer without damaging effects.

Armstrong Named Witco Agent

Armstrong Industrial Supply Co., Trenton, N. J., has been appointed representative of the Witco Carbon Co., Continental Carbon Co., and the Witco Hydrocarbon Co. as agent of carbon black sales for the Witco Chemical Co. All carbon black sold in Mercer County and the city of Trenton in New Jersey will be handled under the supervision of Armstrong Industrial.

Base-Lock Rubber Type

Krengel Manufacturing Co., Inc., 227 Fulton St., New York 7, N. Y., has made available what is said to be a new idea in rubber stamps consisting of easily interchangeable precision cast rubber type in a wide variety of sizes and type faces. Made with natural rubber, the type can be used with all grades and colors of ink. When required, a combination of logotype and individual characters can be used in the same stamp. Krengel furnishes self-inking stamps, as well as flat, roll, rocker date and peg stamps, all of which have a "corrugated" cast-rubber base designed to accommodate the interchangeable type. The corrugated base grips the rubber type and automatically locks it into place. One can take all sizes of type from ⅛ inch to 3 inches in one set-up.

G-E Butyl-Molded Transformer

A new instrument current transformer, said to be the first to which the butyl-molded technique has been successfully applied, has been developed by the Meter and Instruments Division of the General Electric Co., Schenectady 5, N. Y. First of a new line of butyl-molded transformers, the JKM-3 is designed for indoor metering and relay services, rated 5,000 volts at 25-60 cycles, it will be available with single primary in all preferred ratings, 10 to 800 amperes inclusive. The butyl compound, injected under high pressure into the areas around the core, coils, and terminals, provides a homogeneous insulation that is resilient, oxidation-resisting, arc-resisting, and highly resistant to moisture. In addition, it permanently positions these components.

Data on Kel-F Available

M. W. Kellogg Co., Jersey City, N. J., has made available three technical bulletins on Kel-F, the new thermoplastic produced by the company. The bulletins are the result of months of testing for physical and mechanical properties and lengthy study of the various methods of molding and heat treating the product. The first of these bulletins covers the physics and mechanical properties of Kel-F; the next is concerned with various molding techniques, while the last deals with specific thermal treatment for varying the physical properties of the molded material. Copies of the bulletins are obtainable from the Chemical Manufacturing Division of the company.

New Research Company Formed

The Monsanto Chemical Co., St. Louis, Mo., and the American Viscose Corp., Philadelphia, Penna., have formed a new corporation to engage in research and development in the field of synthetic fibers. The new organization, as yet unnamed, is headed by Dr. Carroll A. Hochwalt, vice-president of Monsanto. Dr. Charles S. Venable, director of chemical research of American Viscose, is vice-president, and F. William Koster, also of American Viscose, is secretary-treasurer.

JAPANESE RUBBER INDUSTRY SHOWS REMARKABLE POST-WAR RECOVERY

According to information recently received in this country, the rubber industry in Japan is showing evidences of a remarkable recovery in the post-war period. Although there were less than 400 rubber factories when the bombing ceased, there are said to be some 830 plants consuming natural rubber in Japan today. Japanese productive capacity is controlled and while approximately 30,000 tons are imported yearly, it has been estimated that consumption capacity is near 120,000 tons.

The anti-trust division of SCAP (Supreme Command of Allied Powers) has taken action to dissolve many of the larger Japanese trusts including those in the rubber industry. A case in point concerns the plants of the Ishibashi brothers who before the war owned the Nippon Rubber Co. interests. These plants are located in Kurume, the Akron of Japan, situated on the southernmost island of Kyushu of the Japanese archipelago.

SCAP split Nippon Rubber into two separate companies, Nippon Rubber and the Nippon Tire Co. Dr. Kyoshi Nagata, educated in America and once professor at Kao University in Tokyo, is now president of Nippon Rubber, with Y. Miyake as manager. One of the Ishibashi brothers is president of the Nippon Tire Co. It is interesting to note that in translation Ishibashi means Bridgestone, a name familiar to the rubber industry.

Several of the technical men employed by both companies are former students or graduates of Akron University. Perhaps the best known is the head of the Technical and Research Branch of Nippon Rubber, Dr. M. Kitajima. Dr. Kitajima was once a professor at Tokyo University.

History of Rubber Industry

The Japan Rubber Manufacturers' Association has made available a booklet entitled "The Rubber Goods in Japan" (sic), which reviews the rubber industry as it has existed in that country since the 19th century. The booklet indicates that in 1909 there were 20 plants in the country employing about 800 persons. Products at that time included special items for the Army and Navy, tubing, hose, belting, matting, molded goods, tires, footwear, etc.

The industry experienced a steady growth, so that from the period of 1938 to 1944 an average of 45,000 metric tons of rubber goods were produced annually. At the war's end, remaining productive capacity was set at approximately 36,000 tons, which the Japanese estimated to be some 43% below normal capacity of 63,000 metric tons.

With the war's end, a process of economic stabilization was instituted. A "Planned Production" was put into effect in order to provide for civilian use of rubber products. All the rubber manufacturing plants went under this production schedule. That this plan was successful was due in great part to the fact that there existed in Japan stockpiles of natural rubber, that plants were easily repaired and converted to civil production and that schedules were faithfully followed.

In April, 1946, 1,985 metric tons of natural rubber were consumed, or 175% of the amount consumed in November, 1945, when planned production began. Using November, 1945, as a base period, the Japanese have rarely fallen below production schedules in the months that followed. Shortages of carbon black and other chemicals for rubber compounding as well as limited coal and electric power contributed to those losses in production sustained during the period.

Future Industrial Plans

Since the end of the war, Japan has lost many of her markets for rubber and other products. In order to regain these markets, the Japanese have instituted export programs calling for the shipment of specified amounts of rubber goods to specified areas. The first of these export programs has been approved by SCAP. Under these export programs, footwear takes up approximately 45% of the total, tires and tubes represent another 40%, and the remainder is given over to hose, belting and other products.

Under present economic conditions, the Japanese realize that the export of finished goods is vital to the nation's well-being. The textile and rubber industries, in particular, are dependent upon the importation of raw materials, and these can only be paid for by export of finished products.

In order to facilitate these measures, and in cooperation with SCAP, the Japanese have formed various trade committees and cooperative associations patterned after American organizations to aid in the formulation of the program and to facilitate the work of the occupying powers and the Japanese Government.

Pictured above is one of the two largest rubber plants formerly owned by the Ishibashi brothers through their interests in the Nippon Rubber Co. The plants are located in Kurume, the Akron of Japan. The footwear and mechanical products plant employs 6,000 workmen, while the tire plant employs between 4,000 and 5,000.

Closing Two Synthetic Plants

The Reconstruction Finance Corporation has decided to close two Government-owned synthetic rubber plants in California. The plants are the butadiene unit at El Segundo, operated by the Standard Oil Co. of California, and the copolymer plant at Torrance, operated by the Goodyear Synthetic Rubber Corp. The RFC decision to place the plants on a stand-by basis was disclosed by Chairman Harley Hise who said that a decline in the consumption of synthetic rubber from 34,000 to 25,000 tons per month requires curtailment of operations. He said an economic study, taking into account shipping charges, showed that production of the two California plants can be transferred to other plants at a greater saving to the Government than if other production were transferred to the California plants. The El Sugundo plant, employing 200 persons, will be shut down about September 1, and the Torrance plant, employing 100 persons, will be shut down three or four weeks later. The Government styrene plant at Los Angeles, operated by the Dow Chemical Co., will continue in production.

Vinylite Dispersion Resin NV.4

Bakelite Corp., New York 17, N. Y., has announced the commercial availability of a new grade of vinyl resin having a wide range of possible uses. The new resin, identified as Vinylite dispersion resin NV.4, is particularly intended for use in preparation of water-based dispersions. Vinylite resin NV.4 is quite similar to the VYNV and VYDR grades of vinyl resin used in preparing organosol and plastisol dispersions and solution coatings, exhibiting the same toughness and chemical resistance. It can be mixed with plasticizer and dispersed in a pebble mill, or, in some cases, on a three-roller mill, and the resulting water dispersions exhibit unusual stability to mechanical agitation, freezing, electrolyte contamination, and to changes upon aging. Fusing temperatures in the order of 300° to 325° F. give optimum properties, and even 250° F. bakes are adequate for many applications.

Precision Metallized Process

Bedford Gear and Machine Products, Inc., 420 Harrison St., Bedford, Ohio, has instituted a precision metallizing process service suitable for building a hard wear-resisting surface on almost any metal part. Worn bearing surfaces, shafts, lathe spindles, mill rolls, concrete forms, valve stems, propeller shafts, and many other parts can be metallized and re-machined to original tolerances with this process. This precision metallizing process is presently being used to repair blow holes in castings, provide a corrosion-resistant lining to plating tanks, make stainless steel overlay on rolls of various types, and to change or repair the contours of molds. In certain applications, the process has been used to line tank cars with corrosion-resistant metals for the handling of highly corrosive liquids.

Croda Polychol I.M. and I.D.

Croda, Ltd., London, England, has announced that the firm can now supply bulk quantities of new water-soluble polyoxyethylene condensation products of wool wax alcohols—non-ionic surface agents consisting of mixed polyoxyethylene glycol ethers of cholesterol, lanosterol and straight chain alcohols. Grades of varying polymerized ethylene oxide content are to be produced but the first to be introduced contain the equivalent of 130-140 molecules per molecule of condensate. These products are being sold under the trade name Polychol, the present materials being Polychol Grade I.M. (mono-ethers) and I.D. (di-ethers). These materials are available in solid anhydrous form or as a 50% solution in water. The product is said to represent an entirely new departure in detergents, and wetting, dispersing, emulsifying, penetrating and spreading agents.

Cordoglas Vinylite Fabric

Cordo Chemical Corp., 34 Smith St., Norwalk, Conn., has produced a new top fabric for recovering convertible automobiles. It is made from Vinylite resins fused to cloth woven of Fiberglas yarns. Known as Cordoglas, the material is said to provide maximum strength and will not shrink or stretch and has resistance to wearing stress, weathering, mildew, fire, oils, greases, and other elements that cause deterioration to ordinary top fabrics. The material is non-absorbent and makes possible the washing of the convertible top in the same manner as washing the rest of the car.

Baltimore Tire Co. Formed

A new corporation, the Baltimore Tire Co., Inc., 1435 South Ponca Street, Baltimore, Md., has been formed and has taken over the business of the old Baltimore Tire Co. The new corporation will continue the business of the old company as tire jobbers, and in addition will manufacture camelback and mechanical goods. Sidney Kahn is president of the new organization.

Named Assistant to President

John L. Cohill

John L. Cohill, until recently in charge of defense products activities for the Firestone Tire & Rubber Co., has been appointed assistant to Lee R. Jackson, president of the company. Born in Altoona, Penna., Mr. Cohill studied at the Carnegie Institute of Technology, England's Royal Military Academy and Oxford University. He served as a captain in the British Army during World War I and shortly thereafter joined the Firestone organization. While with Firestone, Mr. Cohill has served in various capacities in Calcutta, India; Buenos Aires, Argentina; Port Elizabeth, South Africa, and as vice-president of the Firestone International Co. in Akron. During World War II, he was manager of the company's Bofors gun plant, and later became vice-president of the Firestone Aircraft Co.

Hercules Synthetic Resins

Two revised charts listing available synthetic resins and their properties are now obtainable from the Hercules Powder Co., Wilmington, Del. One of the charts lists synthetic resin solutions only and the other includes resins available in solid and solution form. The information on the charts includes trade names of the resins, brief chemical descriptions, and typical test data such as acid number, color, softening point, and viscosity ratings.

Norwalk Protective Committee

A protective committee for holders of stock of the Norwalk Tire & Rubber Co., Norwalk, Conn., has been formed, composed of Elliot E. Simpson, George W. Winchester and Arthur Gottehrer. On May 20, the company filed a voluntary petition for reorganization in the District Court in Connecticut and Wallace W. DeLaney was appointed trustee. Hearing upon the retention of Mr. DeLaney was scheduled to be held by the court on July 7.

Industrial Relations Program

A pioneering program to better intergroup relations among the personnel of American industrial organizations was launched on May 11 in a joint conference sponsored by the General Cable Corp. and the National Conference of Christians and Jews. The project is the first in a series planned for industrial plants throughout the country. The opening session of the nine-week seminar was held at General Cable's Perth Amboy plant. The over-all, national program blueprinted by NCCJ will be known as the "Labor-Management Intergroup Relations Program." It will endeavor to bring to industrial executives and workers an awareness of the evil of prejudice; the huge toll in production losses suffered by the nation through bigotry; and the resultant gains flowing out of greater understanding among Protestants, Catholics and Jews.

Ohio Vetoes Rubber Belt Carrier

Ohio State legislators voted on May 4 to kill the projected plans for the construction of a 130-mile, $210,000,000 rubber belt system between Lake Erie and the Ohio River. The belt, as designed by H. B. Stewart, Jr., president of the Riverlake Belt Conveyor Lines, Inc., Akron, Ohio, and of the Akron, Canton and Youngstown Railroad, was intended as a cheap means of transporting coal and iron ore between Lake Erie and the Ohio River. Strong opposition to the plan was voiced by the railroads in the area and the railroad brotherhoods. The bill which the Ohio legislators voted down in committee would have granted public utility status to the belt line, which would have permitted it to condemn and buy land for a right of way.

Playtoy and Bath Sponge

Phoamite Products, 1537 N. Damen Avenue, Chicago 23, Ill., has placed a children's Playtoy and Bath Sponge upon the market. These toys and bath sponges are made from various thicknesses and densities of foam rubber. Colors are applied by a silk screening process and the finished products are die cut into various figures. The playtoy sponges are soft, harmless and readily adaptable for bath sponge use or playtoy utility when dry. The paints are permanent, non-toxic and will not run in water or crack when the product is stretched or pulled.

A.S.T.M. Pacific Area Meeting

The first Pacific Area National Meeting of the American Society for Testing Materials will be held at the Hotel Claremont in San Francisco, Calif., during the week beginning October 10. Some 70 technical papers will be presented dealing with the field of engineering materials and related subjects, and many of the Society's leading technical committees will hold sessions. A complete list of the technical papers can be procured from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Penna.

Thermoid Stock Purchase Plan

Employees of the Thermoid Co., Trenton, N. J., may now participate in a stock purchase plan which will enable them to eventually control the company, according to a recent statement by Frederic E. Schluter, president. Employees are invited to invest up to 10% of their earnings in the company in any year. The company offers to increase each investment by 20% as a bonus. Dividends will be paid as declared on the stock purchased with this total investment, but the latter will be held in trust for three years. An employee who leaves during the three-year period would receive his investment back without the bonus. An employee who becomes totally disabled or the heirs of a deceased employee will receive the full bonus. The plan is offered on an equal basis to all employees who have been with the company at least two years. Its purpose is to reward continued service and thrift. The plan was approved by the company last December but completion of details and government approval have taken several months. The company had 752,366 common and 53,984 preferred shares outstanding on December 31, 1948, at $5 for the common and $36 for the preferred.

V-Belt Merchandising Program

A new visual merchandising program for fractional horsepower V-Belts has been developed by the Mechanical Goods Division of the Goodyear Tire & Rubber Co. This program includes an entirely new system of determining the proper belt for best use, and determines the proper belt to produce a given horsepower and speed on equipment other than standard. For further simplification, a new type belt measuring device has been developed that measures the length of a belt merely by pulling it through the measuring unit. This unit operates on the same principle as the mileage indicator in an automobile speedometer.

Jefferson Chemical Moves Offices

As a result of expansion of its activities, Jefferson Chemical Co., Inc., has moved its executive and sales offices to new and larger quarters at 711 Fifth Avenue, New York 22, N. Y. The new telephone number is PLaza 9-3900. Jefferson's plant at Port Neches, Texas, which was placed in production early in 1948, manufactures ethylene oxide, ethylene glycol, ethylene dichloride, and other ethylene-based chemicals. Jefferson is jointly owned by American Cyanamid Co., and the Texas Co.

Davol Celebrates 75th Birthday

The Davol Rubber Co., Providence 2, R. I., celebrated the 75th anniversary of the founding of the company at a special dinner at the Narragansett Hotel in Providence on June 28. The dinner was sponsored by the Quarter Century Club of the company. A reception preceded the dinner party.

FINANCIAL NEWS

A. G. Spalding & Bros., Inc.

Six Months Ended April 30: Estimated net income of $400,000 after all charges including an estimated $210,000 provision for federal taxes on income. On the same estimated basis, consolidated earnings for the corresponding period a year earlier were $810,000 after $700,000 provision for income taxes.

Firestone Tire & Rubber Co.

Six Months to April 30: Net profit of $8,149,907, after provision of $2,000,000 to cover earnings of certain foreign subsidiaries which cannot now be remitted, which is equal to $4.01 each on 1,951,334 common shares, compared with $12,129,390, or $6.04 each on 1,950,834 common shares, for the six months ended April 30, 1948.

Dayton Rubber Co.

Six Months to April 30: Net profit of $69,256, which is equal to 5 cents a common share, compared with $249,798, or 45 cents a share for the corresponding period of the previous year. Sales for the six-month period ended April 30, 1949, totaled $11,695,048, against $13,211,248 for the same period of 1948.

Pharis Tire & Rubber Co.

For 1948: Net loss of $892,508, compared with a net income of $358,874 or 85 cents a common share in 1947. Net sales amounted to $8,801,321, against $19,280,272 in 1947.

Sheller Manufacturing Corp.

First Quarter: Net income of $853,190, or $1.53 a common share, compared with $658,576, or $1.17 a share, for the corresponding period last year.

Whitite Coated White Pigment

Blacktite Corp., 19 Hollister Ave., Bridgeport, Conn., has announced the manufacture of a new coated white pigment named Whitite. The product has a covering power comparable to titanium and equal to zinc oxide with a rate of incorporation considerably greater than that of other pigments. The manufacturer claims that those using natural rubber, GR-S or neoprene will obtain a strong, excellent stock by incorporating Whitite in the formula. The physical properties of the rubber mix are equal to zinc oxide-titanium mix, and the tensile and elongation of stocks containing Whitite are equivalent to the same stock containing titanium and zinc oxide. Whitite has a high tinting strength, eliminates the need for other pigments to obtain a fine white stock, permits higher loading with clay and other fillers, reduces power load, and reduces milling time.

Appointments at U. S. Rubber

Appointment of F. M. Urban as sales manager of engineered rubber products and H. Leon Moran as factory manager of its Fort Wayne, Ind., plant, has been announced by the U. S. Rubber Co. Mr. Urban is a veteran of 20 years service in the rubber industry. Born in Chicago, Ill., he joined the company in 1929 as a salesman in the Chicago office. Specializing in industrial rubber products, he progressed through various sales positions until 1935 when he was named assistant district sales manager in the Chicago office. Four years later he was named assistant sales manager for all branch sales in the Mechanical Goods Division. In 1946 he became merchandising manager of the division, a position he held until his present appointment. He will make his headquarters at Fort Wayne. Mr. Moran joined U. S. Rubber in 1922 as a laboratory assistant in the company's Cleveland, Ohio, plant. He progressed through various production positions until 1939 when he was made a divisional superintendent at the Passaic, N. J., plant. In 1945 he became general superintendent of that plant and in 1946 he was named manager of engineered rubber products at the Fort Wayne plant.

Pliolite S-5 Price Reduction

An improved manufacturing process resulting in a new form of Pliolite S-5 for paint manufacturers at a substantial reduction in price has been announced by the Chemical Division of the Goodyear Tire & Rubber Co. Offered July 1 in a new porous pellet form, Pliolite S-5, a high styrene copolymer used in concrete enamels, chemically resistant coatings, plaster sealers, stucco finishes, aluminum vehicles and traffic marking paints, has the desirable solubility characteristics of a powdered resin without the disadvantages of "dusting" during handling or "floating" during dissolution. Price reductions amount to five cents per pound on the familiar Pliolite S-5 milled resin, and 10 cents a pound on the new unmilled form. This places the price of milled resin at 54 cents a pound in carload lots of 36,000 pounds or more, and the unmilled resin at 49 cents per pound for similar quantities. Proportionate reductions were also announced for the Pliolite S-5 bases which are dispersions of the various pigments in the resin.

Changes at Buitenzorg Laboratory

P. Honig has resigned as chairman of the board and director of the Indonesian Rubber Research Institute at Buitenzorg, Java. Mr. D. Farrow, who has been adviser and head of the materials supply board of the Department of Economic Affairs and general adviser to the director of economic affairs on the rehabilitation of the rubber plantations, has been named as chairman of the board to succeed Mr. Honig. G. J. van der Bie, head of the laboratory, has taken over the function of director of the institute.

Carbon Black Quarterly Totals

Production of carbon black during the first three months of 1949 totaled 316,498,000 pounds, of which 165,083,000 pounds were of the channel type and 151,415,000 pounds of the furnace type. These figures compare with a total production of 329,649,000 pounds in the first three months of 1948, of which 168,973,000 were channel and 160,676,000 were furnace. Shipments of black in the first quarter of 1949 amounted to 294,041,000 pounds, including 142,717,000 pounds of channel and 151,324,000 pounds of furnace black. In the first quarter of 1948, 170,007,000 pounds of channel and 150,355,000 pounds of furnace were shipped for a total of 320,362,000 pounds. Producers' stocks of carbon black as of March 31, 1949, stood at 138,777,000 pounds, including 48,490,000 pounds of channel and 90,287,000 pounds of furnace. As of March 31, 1948, 81,691,000 pounds of carbon black were on hand, including 5,922,000 pounds of channel and 75,769,000 pounds of furnace black. In the first quarter of 1949, 86,772,000 pounds of black of all types were exported, which compares with the 80,365,000 pounds exported in the first quarter of 1948.

Hood Acid-Resistant Footwear

Hood Rubber Co., Watertown, Mass., has announced a new line of industrial footwear for use in chemical plants, refineries, abattoirs and other similar industrial fields. A special-purpose synthetic rubber which is said to be highly resistant to chemicals has been used in the footwear. The special rubber resists not only the destructive actions of acids, greases, fats and oils, but also cracking or oxidizing under exposure to light and ozone. It has been adapted to a special process so that boots made from it have no joints or seams. Several different types of footwear have been tested to determine not only resistance qualities but to check several new features. One of these features is a Geon heel liner whose abrasive resistance gives longer wear. Another is a laceless work shoe whose construction permits instantaneous removal from the foot should a worker spill injurious acids inside it.

Checks Sumatra Plantation

A survey party headed by C. E. Titus has started an inspection of the rubber plantation owned by the Goodyear Tire & Rubber Co. in East Sumatra in order to determine the extent of war damages. The task of surveying the 40,000 acre estate is expected to take three months. The study is being made to determine company action in regard to taking over the property after four years of Japanese occupation and three years in the hands of Indonesian republican forces. The plantation is now under a Dutch custodian appointed by the Indonesian Department of Economic Affairs. Dutch planters officially reopened the plantation on February 17, with the expectation that it will yield 1,500 tons of rubber this year, one-tenth of the pre-war output.

Pennsylvania Rock Lug Logger

Pennsylvania Rubber Co., Jeannette, Penna., has developed a new off-the-road truck tire, named the Rock Lug Logger. Designed for all off-the-road operations,

such as strip mining, quarrying, logging and construction work, this new, self-cleaning tire has heavy, chip-proof, S-curved lugs for maximum traction, the company states. The Rock Lug Logger is available in all popular sizes for off-the-road vehicles.

G-E Industrial Heating Program

A new "More Power to America" program designed to show how electric heat, properly applied, can help industry to increase production, provide better equipment designs, and improve product quality has been announced by the General Electric Co., Schenectady 5, N. Y. The Industrial Heating Program, twelfth in the series, consists of a 25-minute, black and white soundfilm, "Heat—Where You Want It," and five different application data booklets covering the major uses of tubular, strip, and cartridge heaters in industry. Arrangements have been made to release the program through G-E district offices to utilities and industrials throughout the country. Those desiring to purchase the program kit, including the sound slidefilm and 50 copies of each of the 5 application data booklets, may obtain it for $15 from G-E district offices.

Technical Guide to Pliolite S-5

A new technical guide on the properties and uses of Pliolite S-5, a high styrene-butadiene resin recommended for use in chemically resistant coatings, has been made available by the Chemical Division of the Goodyear Tire & Rubber Co. The booklet contains all of the previously published information on this resin, along with latest developments. A brief history of the product, its manufacture, properties, formulation and uses are concisely described. Copies of the booklet may be obtained from the Chemical Division at Akron, Ohio.

Rubber Laboratory in Ceylon

A Government-sponsored rubber service laboratory has been established in Colombo, Ceylon, under the direction of a rubber technologist. According to the U. S. Department of Commerce, the laboratory is prepared to assist the rubber industry in Ceylon by suggesting new lines of manufacture as a result of experimental work; by acquainting manufacturers with recent advances in the industry in other countries and demonstrating relatively new techniques; by advising on the proper formula for mixing any type of rubber, and by making further research into the chemistry of rubber with special reference to preservation and deterioration in the tropics. A fund of approximately $85,000 was provided early in 1947 to establish the laboratory, but necessary machinery and equipment ordered at that time was not delivered until 1948. Other activities of the laboratory will be to encourage the use of large quantities of latex, to test the quality of goods domestically produced, to test and analyze imported articles, and to instruct, train, and give technical assistance to representatives of the domestic industry.

Atlantic Research Expands

Atlantic Research Corp., recently formed in Washington, D. C., for the primary purpose of serving research needs of the government, has expanded its activities to include private industry requirements in chemical and chemical engineering research, development, surveys, and consultation. The research organization is prepared to undertake compounding of commercial products and synthesis of organic chemicals such as polyesters, nitrogen ring compounds, sulfur ring compounds, and high polymers. Compounding of rubber and chemistry of rubber compounds will be handled under the direction of Dr. Arthur W. Sloan, president of the company. Dr. Sloan was formerly associated with the B. F. Goodrich Co. as director of rubber chemicals research.

Bangalore Plastics Plant

Machinery and other equipment for a plastics plant has been supplied by an English firm for an installation to be constructed at Bangalore in Mysore, India. The plant contains four 3-inch, six 2-inch and eight 1¼-inch extruders, with wire covering and cable equipment, conveyor and take-off mechanisms, extruder dies and nozzles. British firms will be in charge of construction in conjunction with two Indian apprentices who were trained at the British factories.

New United Engineering Offices

A new general office building for the United Engineering & Foundry Co., at 948 Duquesne Way, Pittsburgh 22, Penna., was formally opened on June 10. The new building houses from 500 to 600 officers and employees of the company. Each of the three floors contains about 16,300 square feet of office space.

CANADIAN NEWS

According to a report submitted to the recent annual meeting of the Rubber Association of Canada, the Polymer Corporation conducted a major program of experimental work on rubber produced at low temperatures during 1948 and as a result has decided to convert at least half the copolymer plant to production of the so-called cold rubber by mid-1949. It is expected this will suffice to satisfy both export and Canadian demand for this new rubber.

Canadian consumption of rubber in 1948 amounted to a total of 75,807 long tons, consisting of natural rubber, 41,567 tons; chemical rubber 20,554 tons, and reclaimed rubber, 13,686 tons. The total consumption was only slightly below the all-time high of 1947.

Domestic sales of practically all classes of rubber products held up remarkably well during 1948 and in most cases were only slightly below the record levels of 1947. Export sales, on the other hand, fell heavily during 1948, except in the case of tires and tubes, sales of which rose substantially. Early 1949 figures, however, show exports of tires and tubes dropping badly.

The reason for the decline is the import restrictions arising from the world dollar shortage, particularly in the British Commonwealth, which has traditionally provided the chief export markets for Canadian rubber products. It is apparent that unless the Government finds some solution to this problem reasonably soon, the industry faces the prospect of losing a great part of its long established export trade with a serious decline in production and employment in Canada as a result.

Imports of manufactured rubber products into Canada remained abnormally high, especially in the field of industrial rubber products. Several instances of "dumping" from the United States were noted during the year, and as competition in the U. S. rubber industry becomes more severe, the Canadian industry will have to maintain a vigilant look-out against this type of unfair competition during the coming year.

Capital expenditure totalling $2,250,000 is provided for in the Polymer Corporation 1949 budget, it has been disclosed following the annual meeting of the Crown Company's board of directors.

Principal expenditure will be $1,100,000 for ethane cracking furnaces designed to double Polymer's output of ethylene, and provide for increased sales to Dow Chemical of Canada, Limited. Increased production will also enable Polymer to boost its own output of styrene, used both in synthetic rubber and in polystyrene plastic.

Ways and means of increasing Polymer's ethylene production have been studied since the latter part of 1948, it was disclosed. At that time it became apparent there would not be sufficient ethylene to meet the combined requirements of Polymer and Dow. The latter company had recently expanded its ethylene glycol plant.

As a result of a co-operative arrangement, certain ethane cracking furnaces, surplus to Dow's operations at Freeport, Texas, were made available to Polymer. This advanced by several months the date when increased supplies of ethylene would be available.

Erection of the ethane cracking furnaces is already well advanced at Polymer, and the bulk of the construction work is expected to be completed late this summer. Some additional supplies of ethylene will be available by the end of August, it is expected.

Contract arrangements now being completed between Dow and the Crown Corporation will call for the delivery of an average of 60,000 pounds per day of ethylene to Dow.

Gross value of products turned out by the Canadian rubber industry in 1947 rose to an all-time high of $196,308,000 as compared with $159,408,000 in the preceding year, and compares with the previous record figure of $181,413,000 in 1945, according to industry totals released by the Dominion Bureau of Statistics.

Sixty plants were in operation in 1947, furnishing employment to 23,475 persons who received $46,614,000 in salaries and wages, as compared with 22,055 employees earning $37,813,000 in 1946. Ontario employed almost 72 per cent of the persons engaged in the industry and produced over 82 per cent of the entire output, while 28 per cent of production was in Quebec.

Of the three main classes of products manufactured, rubber tires and tubes accounted for $112,850,000 or over 57 per cent of the total, rubber footwear for $35,927,000 or over 18 per cent, and other products for $47,534,000 or over 24 per cent. Compared with the previous year, output of rubber tires and tubes increased in value by $39,233,000 or over 53 per cent, rubber footwear by $9,704,000 or 37 per cent, while other products declined by $12,037,000 or over 20 per cent.

Rubber consumption in Canada declined 11 per cent in April from 14,554,000 the previous month to 13,054,000 pounds, the Dominion Bureau of Statistics reports. Use of synthetic rubber increased, but natural and reclaim rubber declined.

Consumption of synthetic rose to 3,948,000 pounds from 3,916,000 while natural fell to 6,888,000 pounds from 8,109,000 and reclaim to 2,218,000 pounds from 2,529,000.

In terms of end-product use, consumption of all rubber in the production of tires and tubes, including tire repair material, decreased by 923,000 pounds, in rubber footwear by 289,000 pounds, in wire and cable by 70,000 pounds, and in other products by 221,000 pounds.

LOS ANGELES NEWS

The June 7 meeting of the Los Angeles Rubber Group held at the Hotel Mayfair, Los Angeles, Calif., was sponsored by the Kirkhill Rubber Co. of Los Angeles, with T. K. Hill, president of the company, and his entire staff in attendance. The regular dinner meeting was preceded by a technical group session at which Dr. R. B. Stringfield of the Fullerton Manufacturing Co. spoke on "Patents and the Production Man." Judge Leroy Dawson, of the Los Angeles Superior Court, gave an amusing talk on "What Makes an American Tick?" at the dinner meeting.

Mr. Stringfield introduced his subject by defining a patent as a contract between an individual and his government for the purpose of protecting the rights of the inventor and granting him a limited monopoly on his invention and the products derived from its use for a period of 17 years. The issuance of a patent signifies that, in the opinion of the patent office, the idea or device is new and novel and that it has not been disclosed before. It does not guarantee that the patent is valuable or even valid.

The speaker stated that it ordinarily requires three years from the date of application for a patent until the patent is issued but that the interval between application and issue is often much longer because of legal disputes over priority or interference or through the devices available to the inventor which enable him to delay the issue date to his own advantage. Mr. Stringfield pointed out that the patent system has had a tremendous effect on the economy of the country. Patents have been responsible in part for the establishment of many private fortunes and have made possible many of our major industrial developments.

In conclusion, Mr. Stringfield stated that the patent officials today are requiring more genius in inventions than they did before the war. He stated also that the world is currently getting back to the prewar principles of reciprocal patents. He warned inventors that for their ideas to be eligible for patent, the application must be filed within one year of the first public disclosure or in the case of a mechanical device within one year of its display for sale. He stressed the importance of keeping adequate notes, preferably in ink and in a permanently bound book. He stated that it is important to have these notes properly witnessed at frequent intervals as such notes will be invaluable in establishing the inventor's right to patent his idea.

Extend Use of Heated Rubber

B. F. Goodrich Co., Akron, Ohio, has announced the extension of the use of electrically-heated rubber of the wire resistor type to industrial applications. The electrically-heated rubber is constructed of resistance wires insulated with fabric plies sandwiched between layers of rubber sheeting with the parallel wires running the length of the rubber. The company says the rubber can be furnished in any reasonable size, shape or weight and for temperatures up to 300° F. Synthetic rubber of a type which is heat, weather and oil resistant is used. It can be applied by adhesion or placed on a metal background for bolting into permanent position. Among uses already reported in industry for this rubber by Goodrich are a strip heater for moisture control to reduce condensation in a deep freeze unit, heat booster pads for tire repair machines and as foot warmer pads for cold floors.

Original Equipment Tire Sizes

The Rubber Manufacturers Association has released a display chart containing original equipment tire sizes and the recommended correct inflation pressures for all makes and models of automobiles for the period 1941-1949 inclusive. The chart also contains cautionary information concerning the maintenance of correct inflation pressure in extra low-pressure tires. The display chart is a continuance of the campaign started last year by tire manufacturers, makers of tire inflation equipment and tire marketers to improve tire service and promote highway safety by making available accurate information concerning correct inflation pressures. The association has a limited number of charts available for distribution. Address the Rubber Manufacturers Association, 444 Madison Avenue, New York, N. Y.

Plastic Sports Ball Bladders

A complete line of plastic bladders made from Vinylite for footballs, basketballs, and other sports inflatables has been developed by Plextron, Inc., New York, N. Y. Plastic bladders under the trade name of Plex-Tite were first introduced in 1948 on an experimental basis by Plextron. The experienced gained from the production of the experimental bladders has led to a number of improvements in the current models, particularly in the design of plastic valves and in the method for making electronically welded seams. The Plex-Tite needle valve employs a double constructive plastic collar, while the inflated bladder can bear the weight of 300 pounds.

Uses of Radioactive Materials

Arthur D. Little, Inc., Cambridge 42, Mass., has prepared an extensive bibliography on the industrial uses of radioactive tracers. Included within the bibliography are general background references, survey articles of industrial application, and references dealing with specific fields and industries. Copies of the bibliography are available from the company upon request.

Two-Way Rubber Door Stop

A new and interesting solution to the problem of how to hold a door part-way open is a new two-way door stop developed by the Friend Laboratories, 70 Fulton St., New York 7, N. Y. The new door stop holds a door firmly in any desired position, blocking motion in both

directions. Made of one-piece molded rubber, it fits neatly under the end of any door, as indicated in the accompanying illustration, and can easily be put in place and removed by the foot. The item is so designed that it may also be used like the usual type door stop, under one side of the door, if desired. The Friend Laboratories is interested in hearing from rubber manufacturers who may wish to produce the new door stop under a royalty arrangement.

Hewitt Rubberlokt Wire Brush

Hewitt Rubber Division, Hewitt-Robins, Inc., Buffalo 5, N. Y., has announced the development of a new rotary wire brush with bristles imbedded or locked in rubber centers. The brush, called Rubberlokt, eliminates localization of bristle fatigue by allowing the wire bristles to flex over a gradual arc of their entire length. Furthermore, the bristles may be worn down to the rubber flange. The flexibility of the rubber core enables the wire bristles to return upright after each contact with the surface to be brushed. The company is presently producing six, eight and ten-inch industrial sizes. The brush can be used either on bench or portable tools, and its potential market includes all industries where buffing, roughing or finishing with a wire brush is part of the operation.

Permanente Buys Aluminum Mill

The War Assets Administration has announced the sale of an aluminum rod and bar mill at Newark, Ohio, to the Permanente Metals Corp., Oakland, Calif. The price was $4,500,000, including $450,000 in cash. The balance is to be paid in twenty years with interest at 4%. The property and equipment cost the government $22,712,371. Its estimated value now is $13,165,813. The plant was operated during the war by the Aluminum Company of America. It has since been under lease to Permanente.

Super-Sure-Grip Garden Tires

Goodyear Tire & Rubber Co., Akron, Ohio, has announced what is said to be the first tire for wide-base rims ever to be designed specifically for garden tractors. Known as the Super-Sure-Grip, the new tire is a companion to the wide-base large tractor tire of the same name, first introduced by the company last summer. The new garden tractor tire is said to offer better flotation, greater traction and improved appearance. Of two-ply construction, the tire also has deeper tread design in all sizes. Typical of the rim size change is Goodyear's former tire for garden tractors, the 5.00-12, calling for a three-inch width rim. Corresponding to this in the new tire is the 6-12 size, built to operate on a five-inch width rim. Already in production, the new tire is available in the following sizes: 5-12, 6-12, 6-16, 7-16 and 8-16.

Bakelite Increases Facilities

Greatly increased facilities for the production of polyethylene resins have been announced by the Bakelite Corp., unit of Union Carbide and Carbon Corp., New York. According to Bakelite officials, these new facilities will more than double the amount of this plastic raw material that has been in extremely short supply since being made commercially available late in 1942. The new production facilities are located at Charleston, W. Va., and are operated by Carbide and Carbon Chemicals Corp., another unit of Union Carbide and Carbon. When the rated capacity of the new facilities is reached, the production of polyethylene for the entire industry will reach approximately 50,000,000 pounds per year, as compared with about 15,000,000 pounds last year, company officials said.

Geon Plastics in Cubical Form

The manufacture of certain Geon plastic extrusion compounds in uniform cubical form has been announced by the B. F. Goodrich Chemical Co., Cleveland 15, Ohio. In the wire and cable industry, the new cubical granules are expected to increase considerably the efficiency of the extrusion operation and the quality of vinyl insulation. The company states that more even and complete heating of Geon plastic is made possible during extrusion because of uniform cubical size. Porosity sometimes caused by entrapped air in non-uniform granules is minimized.

Fatty Acid Chart Available

Useful information for industrial chemists is now available in a new comparison chart on fatty acids, issued by Archer-Daniels-Midland Co., Minneapolis 2, Minn. Compiled by ADM's research staff, Technical Bulletin 77 shows constants and compositions of 23 vegetable oils, plus all commercially available animal and marine fats and oils. In addition to containing the mean analysis of each product, it also shows the range of analysis. Copies may be obtained from the company.

OBITUARIES

Joseph F. Westendorf

Joseph F. Westendorf, president of the Premier Rubber Manufacturing Co., of Dayton, Ohio, died at his home in Dayton on June 6. He was 80 years old. Born in 1869, Mr. Westendorf attended Holy Trinity Parochial School and the A. D. Wilt Commercial College in Dayton. He began his industrial career as a wheelmaker for the S. N. Brown Co. of Dayton. Mr. Westendorf suffered an arm injury there, and while convalescing he attended the Wilts school and studied bookkeeping. In turn he was employed as a bookkeeper for the Martin Schneble Sons So., the John Stengle Co., and the Sterling Motors Co., all of Dayton. While serving as secretary and treasurer for the Sterling company, he and his brother John founded the Dayton Casting Co. in 1909. He had been president of the firm ever since. In 1922, Mr. Westendorf became associated with the Premier Rubber Manufacturing Co., and also served as its president until his death. Mr. Westendorf was very active in civic affairs and in Catholic charities. Services were held on June 10 in Holy Trinity Church in Dayton with burial in Calvary Cemetery. He is survived by his widow and two brothers.

Katherine E. O'Brien

Miss Katherine E. O'Brien, former secretarial assistant to Herbert E. Smith, chairman of the U. S. Rubber Co., died of a heart ailment while visiting at the home of her brother in White Plains, N. Y. on June 19. She was 70 years old. Miss O'Brien retired in 1946 after 48 years of service with the company. Services were held on May 22 at the Durand Funeral Home in White Plains with interment in Woodlawn Cemetery, New York, N. Y.

George B. Glaenzer

George Brette Glaenzer, retired sundries sales manager of the American Hard Rubber Co., New York, N. Y., jumped to his death recently from his thirteenth floor suite at the Yale Club, New York, N. Y. He was 64 years old. Mr. Glaenzer was graduated from Yale with the class of 1908. The police listed the death as a suicide.

William B. Augustine

William B. Augustine, retired president of the Perfection Rubber Co., Akron 11, Ohio, died on June 25 at his home in Akron after an illness of three years. He was 80 years old. Born in Shelby, Ohio, Mr. Augustine had lived in Akron for 60 years. Services were conducted on June 28 in Akron. His daughter survives.

Harold C. Kinsey

Harold Clyde Kinsey, president of the Cameron Machine Co., Brooklyn, N. Y., died at his home in Brooklyn on June 25, after a protracted illness. He was 67 years old. Born in Philadelphia, Penna., in 1882, Mr. Kinsey spent most of his business career in the publishing business, first with John Wanamaker in Philadelphia, then with Doubleday, Page & Co., and later with the Cosmopolitan Book Co., of which he was publisher. During this period Mr. Kinsey was a director of the Cameron Machine Co. In order to devote his full time to Cameron, he sold his publishing interests to G. P. Putnam's Sons in 1943 and became president of the Cameron Machine Co. Mr. Kinsey was a member of the Dutch Treat Club and the Players. He was a past president of the American Association of Booksellers. His daughter survives.

Henry Perlish

Henry Perlish, who retired in 1945 from the vice-presidency of Charles T. Wilson Co., Inc., New York, N. Y., died on June 19 in St. Joseph's Hospital, Far Rockaway, Queens, N. Y. He was 60 years old. Born in Philadelphia, Penna., Mr. Perlish joined the Wilson Trading Co. in 1907. In 1914 he became associated with the Charles T. Wilson concern. Mr. Perlish was a former member of the New York Commodity Exchange. A collector of stamps, Mr. Perlish was a member of the Pre-Canceled Stamp Society and the Society of Philatelic America. His widow, two sons and two daughters survive.

Alexander C. Nixon

Alexander C. Nixon, superintendent at the engineering laboratory of the Fisher Body Division of the General Motors Corp., Detroit, Mich., and a member of the executive committee of the Detroit Rubber and Plastics Group, died on June 8 in Harper Hospital in Detroit. He was 55 years old. Born in New York City, Mr. Nexon was a chemist at the Ford Motor Co. before joining General Motors. He was a graduate of Tufts College and a member of Delta Upsilon. Mr. Nixon had been a member of the Detroit Group for several years. His wife and two sons survive.

Edward W. Freundt

Edward W. Freundt, manager of the Chemical Division of Armour & Co., Chicago, Ill., died in Seattle, Wash., on July 3, after suffering a heart attack while on vacation. Mr. Freundt, widely known in the chemical industry, had been associated with Armour for the past 22 years.

Melvin S. Lower

Melvin S. Lower, president of the Enduro Rubber Co., Ravenna, Ohio, died at his home in Ravenna on June 25 at the age of 62. Born in Holmes County, Ohio, Mr. Lower entered the rubber business in 1900 when he went to work for the Pure Gum Specialty Co., in Barberton, Ohio. In 1919 he went to Millersburg, Ohio, to found the Forester Rubber Co., and in 1922 founded the Sumatra Rubber Co. in Salem, Ohio. This company, and the Marlonite Rubber Co., were merged to form the Sun Rubber Co. of Barberton, of which Mr. Lower served as vice-president. Mr. Lower left Sun Rubber in 1937 to found the Lower Rubber Co. in Ravenna. Mr. Lower sold this company to the Chamberlain Engineering Co. in 1942. He remained with Chamberlain as general manager until 1946, then resigned to become factory manager of the Ideal Rubber Co. in Brooklyn, N. Y. Several months later he returned to Ravenna, and with his two sons founded the Enduro Rubber Co. Mr. Lower was a member of the Ravenna Kiwanas club, the Masonic Lodge in Ashland, Ohio, and the Elks, Modern Woodsmen of America and the Moose. Besides his two sons, he leaves his wife and a daughter.

Matchless Carbolized Fire Hose

U. S. Rubber Co., New York 20, N. Y., has developed a new high strength fire hose that is highly resistant to acids and acid fumes, oil and gasoline. Named "Matchless Carbolized Fire Hose," it is designed primarily for fire protection and general wash down service in acid plants and oil refineries, but it is also practical for such heavy-duty service as street cleaning, sewer flushing and paving operations. The hose is constructed with a natural rubber tube, two plies of chemically-treated cotton cord fabric, and a neoprene cover. This type of construction is said to give the hose strength to resist 400 pounds per square inch test pressure and at the same time permits greater flexibility and light weight. The cotton fabric used for the plies is an adaptation of Ustex cord which is widely used in the construction of heavy-duty conveyor belting. The neoprene cover is 5/64 inches thick, heavy enough to resist abuse yet light enough to avoid bulkiness.

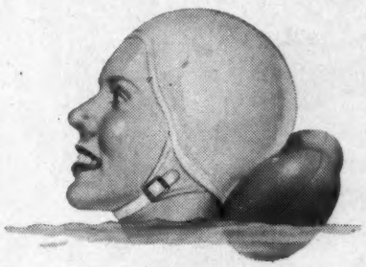
Elmes Division in New Quarters

Elmes Engineering Division of American Steel Foundries, has moved to larger, more modernly equipped quarters located at 1150 Tennessee Avenue, Cincinnati 29, Ohio. The Elmes organization, founded nearly a century ago, occupied a plant in Chicago, Ill, since 1892. The present move was necessitated by the inadequacy of the Chicago location due to increased demand for Elmes hydraulic machinery products, division spokesmen said. All departments of the division, including operations, manufacturing, engineering, sales and management, are now permanently located at the new address.

NEW RUBBER GOODS

Flo-Ting Swim Cap

A new and novel swimming aid, said to be especially helpful to beginners, either children or adults, is the Flo-Ting Swim Cap, a product of the Hasbrouck Marine Products Co., Hasbrouck Heights N. J. The unit consists of a



regular rubber swim cap and an inflatable vinyl bladder which snaps into position on the back of the cap. Once inflated and snapped into position, the bladder enables the swimmer to keep his head above water at all times. It supplies sufficient buoyancy to enable the wearer to stay afloat even when caught in an undertow or when paralyzed by cramps. The inflated float in no way interferes with swimming action.

Sanitile Welded Vinyl Floors

Interchemical Corp., in cooperation with the Boston Woven Hose & Rubber Co., and the Chemicals Division of the Glenn L. Martin Co., has developed a vinyl plastic welded floor tile called "Sanitile." Literally a three-layer "sandwich" welded together, each layer is said to contribute specialized product qualities. The first layer is pure vinyl, while the intermediate layer has the purpose of providing design and color. The "design layer" is composed of pigmented vinyl, incorporated into the flooring during the welding process. Sanitile can be laid over wood, concrete, plywood, or most any other type of floor. The surface of the top-coat has a soft satin finish which requires no waxing but which supports a high luster when waxing is desired. It is impervious to soaps and common household chemicals, alcohol, grease and oil.

Rib Lightweight Bicycle Tire

A new tire especially designed for lightweight bicycles has been announced by the Goodyear Tire & Rubber Co. Termed the Rib Lightweight, the tire is currently being manufactured by the firm in two sizes, the 26 x 1¼, for American and English made vehicles, and the 26 x 1⅜ for English models. Built with relatively small cross section and contour designed to insure easier rolling, the new tire should give the maximum of easier ride, company officials state.

Smooth-Tread Farm Tires

Believed to constitute one of the final steps in the evolution of steel wheels to rubber tires for farm implements is a new smooth-tread tire announced by the Goodyear Tire & Rubber Co. The tire is designed primarily for use on corn planters, one of the few farm machines still operating largely on steel wheels. The new tire is of the 6.50-16 size, of two-ply construction. It operates at extremely low pressure, with only two pounds of air recommended. Chief among its advantages, according to Goodyear, is the fact that its smooth tread does not pick up moist or sticky soil, thereby making corn planting less dependent upon dry weather. The smooth tread and low pressure are also less likely to cause soil packing. Smooth tread of the tire does not materially affect its wearing qualities, since corn planters operate in soft ground, and normally on an average of but from one to two weeks throughout the year.

Firestone Velon Garden Hose

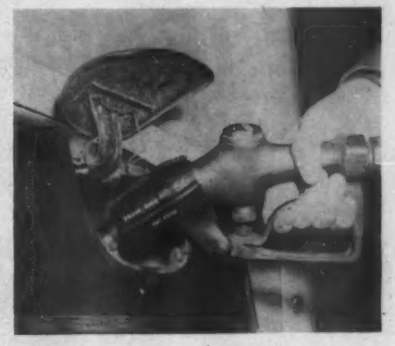
Tough, durable all-plastic garden hose, one-third lighter in weight than ordinary hose, is now in production by the Firestone Plastics Co., Akron, Ohio. Made from Firestone's own high molecular weight vinyl resin, the new Velon garden hose resists oil and grease, sunlight, heat, cold, mildew and rot. Produced in Hunter Green color, the hose is streamlined in design, with an inside diameter of one-half inch and an outside diameter of three-quarters of an inch. It has full flow capacity and solid brass, machined fittings. Under test, the Velon hose has withstood more than 500 hours of exposure to artificial sunlight without showing signs of cracking, stiffening or discoloring; and under tests at 15° F., it showed satisfactory resistance to cracking on sharp flexing, and impact. Velon hose is offered in 25 and 50 foot lengths.

Coal-Flo Rayon-Carcass Belts

The Goodyear Tire & Rubber Co., Akron, Ohio, has developed a new type of rayon-carcass conveyor belting which has been added to the company's Coal-Flo line. Particularly adaptable to the close operations experienced in underground mines, the new belting utilizes a four-ply rayon carcass structure which results in a highly flexible belt. The rayon's greater strength permits the use of belt systems with longer centers, pulley to pulley, reducing the number of transfer points and number of drives required, the company said. The rayon belt incorporates two principal features of other Goodyear belting, mildew resistance and acid neutralization. The belt is manufactured in standard 26-inch and 30-inch widths.

Hood No-Nik Nozzle Guard

A conductive neoprene jacket that fits over the nozzle of a gasoline hose to keep fenders from being scratched, is



being manufactured by the Hood Rubber Co., Watertown, Mass. Termed the No-Nik, the nozzle guard employs neoprene because of its resistance to the harmful effects of gasoline, sunlight and weathering.

General Mining Special Tire

Latest addition to the tire line of the General Tire & Rubber Co. is the Mining Special tire. The new General tire is designed with an extremely wide tread for greater flotation and extra, thick, reinforced shoulders for mine duty. The smooth sidewall resists cuts, snags and bruises. Gripping action is assured by extra deep, cleated, self-cleaning tread "dig-ins." According to the company, new trackless mining equipment rolling on these tires offer mine operators all the advantages of rail handling plus greater speed and mobiilty on the job. The Mining Special is available in sizes 7.50 x 15, 10 and 12 ply, 8.25 x 15, 12 and 14 ply, and 10.00 x 15, 14 ply.

Nu-Fab Fabric Rubber Paint

Adhesive Products Corp., 1660 Boone Avenue, New York, N. Y., has developed Nu-Fab, a fabric rubber paint designed to rejuvenate fabrics ranging from lamp shades and upholstered chairs to awnings and convertible tops. The plastic rubber non-inflammable paint remains flexible when dry, retards fire, dry rot and mildew, repels moths, strengthens old fabrics, seals small holes and waterproofs, according to the company. It dries in half an hour and may be washed even in boiling water. Nu-Fab comes in twelve colors and may be applied with either a brush or spray.

Fire-Resistant Press Roller

A new type press-roller that will not support fire has been announced by the Mechanical Goods Division of the Goodyear Tire & Rubber Co. Besides its fire-resistant quality, the new press-roll will not swell under the action of oily inks. Research technicians for the company state that the new printing industry product will retain its original hardness throughout its life, will keep proper resilience, and will require less re-grinding than ordinary rollers.

Set this Gage

...then forget your thickness troubles

That's all there is to it. Once it's set, the "Magnetic" Schuster Gage keeps a constant, continuous check and control of material-thickness right on the roll during processing. Any variation beyond set limits is detected by the Gage and results in any instant action you desire: a warning signal, or automatic corrective adjustment of the mill, or automatic stopping of equipment.

Every P&W setup — consisting of "Magnetic" Schuster Gage, "Magnetic" Control Meter, power unit — is planned to eliminate time-and-material-wasting thickness variables. Pratt & Whitney is prepared to recommend the best setup for your equipment and requirements. New descriptive literature is yours for the asking.

Pratt & Whitney
Division Niles-Bement-Pond Company
WEST HARTFORD 1, CONNECTICUT

"Magnetic" Schuster Gage

NEW EQUIPMENT

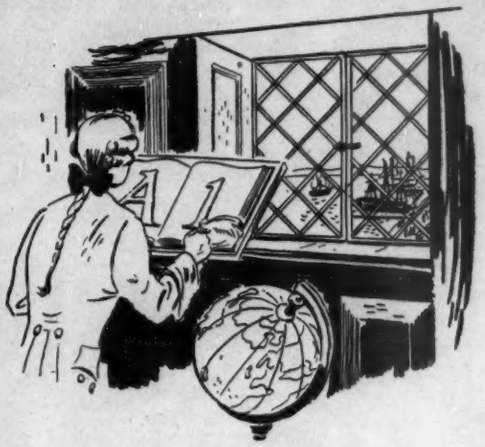
Pangborn Hydro-Finish Cabinet

A modified form of impact blasting utilizing an abrasive suspended in a liquid which is delivered to the blasting nozzle by means of a circulating pump, is offered in the Hydro-Finish Cabinet marketed by the Pangborn Corp., Hagerstown, Md., for the cleaning of rubber and plastic molds. Velocity is imparted to the

suspension as it flows through the blasting nozzle by the injection of compressed air, normally 90 pounds per square inch. As the abrasive particles are suspended in a liquid, there is no limit to the fineness of the particle which may be used. The carrying media in most general usage is water plus the addition of corrosion inhibitors which prevent or retard corrosion. The process is accomplished in a water-tight cabinet provided with a hopper tank for mixing, storing and recollecting the suspension, and a circulating pump for delivering the suspension through the blasting gun.

The blasting gun is equipped with two lengths of flexible hose, one for abrasive feed and one for air supply. The cabinet is furnished with vision windows, loading doors, air control valves, ventilating system to remove the fog created by blasting, window wash system, and a lighting system. The operator works from the outside of the cabinet and places his arms through the gauntlet-covered armholes provided. The work to be finished is then held in one hand or rested on a work table and the blasting stream is directed at the work by means of his free hand. Due to the fact that Hydro-Finish can employ the use of extremely fine mesh abrasives, it is possible to process precision machined parts and hold these parts within tolerances as close as .0001 inch where required. Abrasives as coarse as 60-mesh and as fine as 5000-mesh equivalent can be used satisfactorily.

THE STORY BEHIND THE WORD...



A-1...

Lloyd's ship register, which lists and rates every ocean-going ship in the world, has a very logical way of abbreviating their data. For the condition of a ship's hull, they use letters starting with "A" as the best. For the ship's equipment, they use numbers starting with "1." "A-1" then means a ship's in perfect shape, hence, as it's used today, anything that's the best.

A long record of strength, stability and progressive leadership has made the word Muehlstein—the First Name in Scrap Rubber.

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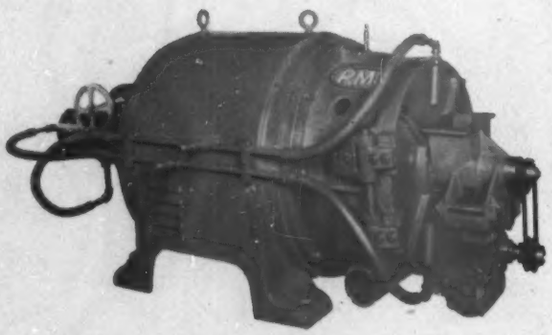
P. M.
GRINDING AND CUTTING EQUIPMENT

•

HEAVY DUTY CUTTER

- This machine is specially designed for reducing to small size pieces all kinds of soft and hard rubber scrap.
- Water cooled sides allow continuous operation of the machine, without overheating.
- Provided with safety type drive pulley.
- The capacity of the P.M. CUTTING MACHINE is from 600 to 1000 lbs. per hour on soft rubber and 1000 to 1500 lbs. on hard rubber scrap.
- Power required 10 H.P. 4 V-belt drive.



HEAVY DUTY RUBBER GRINDER

- Available in Direct or Belt Drive.
- 50 H.P. motor.
- Operation entirely automatic.
- Water cooled to permit continuous operation without overheating.
- Fineness of ground rubber easily adjusted by simple turn of wheel.
- Capacity 400 to 800 lbs. per hour.

Developed to meet the need for a more rugged Scrap Rubber Grinder with increased capacity.

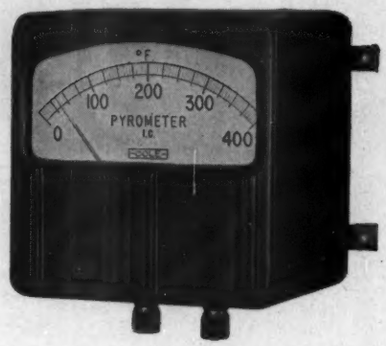
RESEARCH ENGINEERING COMPANY

102-21 63rd Drive

Forest Hills, L. I., N. Y.

Cole Model 140 Pyrometer

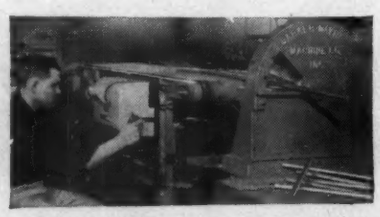
Designed for industrial use where a long scale, high accuracy instrument is required, the Model 140 Wall Mounting Type Pyrometer recently announced by the Cole Instrument Co., 1320 So. Grand Avenue, Los Angeles 15, Calif., has an accuracy of 1% of full scale in millivolts. Over-all height including binding posts is



6½ inches; over-all width including mounting lugs is 6⅝ inches; depth is 4¼ inches, and the instrument weighs 2.99 pounds. Applications for the Model 140 include temperature measurements of rubber, molten metals, plastics, etc., as well as the temperature of processing and manufacturing machinery, rolls, molds, etc. The pyrometer is furnished with automatic cold end compensation in the lower ranges which automatically eliminates errors caused by variations in room temperature at the instrument terminals. To further insure accuracy, Model 140 is equipped with special controlled radius pivots and sapphire jewels.

Barker-Davis Cut-Off Attachment

Said to be the first of its kind used in rubber and plastic extruding machines, the Rotary Cut-Off Attachment produced by Barker & Davis Machine Co., Inc., Leominster, Mass., features multiple blades which cut through the stock and position it for the next cut on



the conveyor attachment. The unit is controlled by a timer and a solenoid-activated single revolution clutch which permits the cutting of sheets and tubes without a sagging action. It will take any desired length up to 30 feet; longer cuts may be attained by minor gear changes. The unit has a ½ h.p. motor and weighs 325 pounds. The timer weighs 50 pounds.

Look to the Record for PERFORMANCE!

R. D. WOOD
Hydraulic Presses
and Machinery
for the
Rubber Industry

The top performance of R. D. Wood hydraulic presses and machinery is a matter of record throughout the rubber industry. Men who know—engineers, production managers, maintenance men—say that for ease of operation, low maintenance, and efficient, economical, *quality* service, you can't beat R. D. Wood equipment! Write to R. D. Wood for catalogs or information on hydraulic presses and machinery, designed in sizes and capacities for any operation in the rubber field.

HYDRAULIC PRESSES AND ... FOR EVERY PURPOSE
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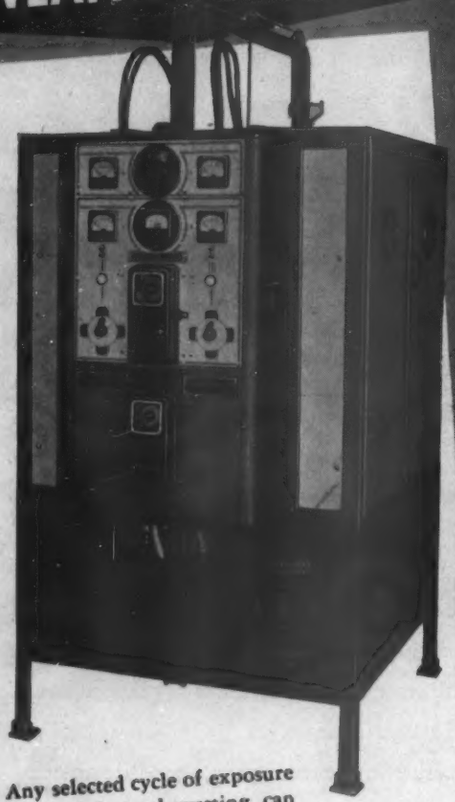
PUBLIC LEDGER BUILDING, PHILADELPHIA 5, PA.

Weathering qualities of
RUBBER PRODUCTS
determined with reliable
accuracy in the

ATLAS *twin arc*
WEATHER-OMETER



Any selected cycle of exposure to sunlight and wetting can be set for automatic continuous testing in the Weather-Ometer. Exact tests can be duplicated at any time by settings on the control panel which contains temperature regulator—time meter—light and water cycle switch — automatic cut-off switch — voltage adjusting switch — direct reading thermal regulator — reactance coil (for economical current consumption). The Weather-Ometer is fully automatic in operation; can be left unattended over night; only necessary to renew carbons once in 24 hours. Years of exposure to any conditions of weathering reduced to a few days testing in the laboratory with the Weather-Ometer.

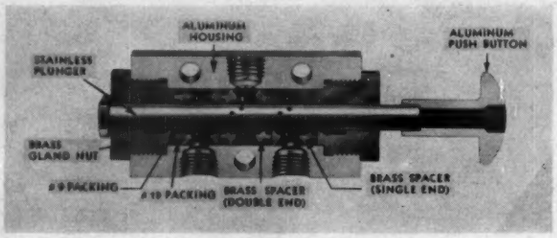
Originators and sole manufacturers of accelerated testing machines for over a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer — the accepted standard testing machines used all over the world.

ATLAS ELECTRIC DEVICES CO.
361 West Superior Street, Chicago 10, Illinois

Hunt Single Plunger Valves

Well suited for use with manually controlled presses, pilot circuits, and in other processing cycles when frequent manual operation is required, the series "O" and "OE" single plunger valves produced by C. B. Hunt & Son, Inc., Salem, Ohio, feature the utmost simplicity in design.

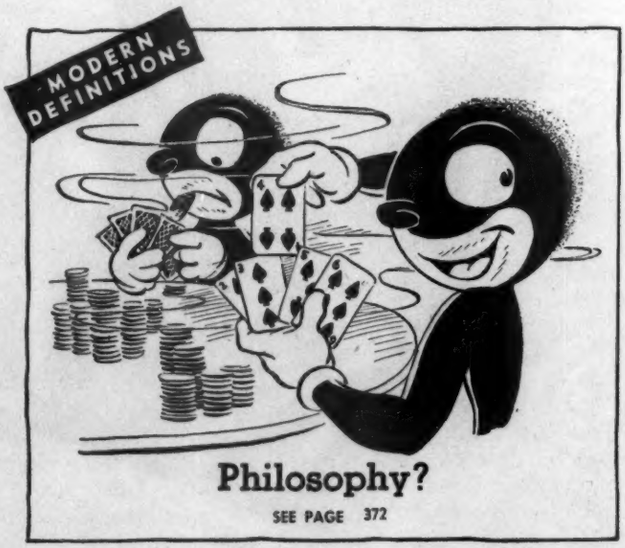
As illustrated in the sectional view herewith, the valve consists of an aluminum housing; a hollow stainless



Sectional view of new Hunter valve

steel plunger with precision placed ports; carefully dimensioned brass spacers that are accurately proportioned end to end on each other (not through packing); efficient "O" ring packers; and closing brass gland nuts and an aluminum push button. The valves are balanced and will remain in position until changed. A spring can be mounted between the push button and gland nut when spring return action is desired. The flow is through the plunger and around the seals thus prolonging the life of the packing and the valve parts.

Series "O" and "OE" valves are furnished tapped for either ⅛-inch or ¼-inch pipe connection, and are available in 2-way, 3-way open exhaust, 3-way piped exhaust, double 2-way, 4-way, and 5-way designs; and with either push-pull or push and spring return actions. These valves are suited for use with air, oil or water, at pressures up to 125 psi maximum (also vacuum) at normal temperatures, not exceeding 150° F. Class "O" valves have piped exhaust. The "OE" valves have an open exhaust, and should be used with air only.



* Rebuilding worn parts to original dimensions, and hard-surfacing with our exclusive abrasion-resistant material.

Body assembled on Horizontal Mill for precision checking of alignment of bearings; bolt holes for body fitting bolts, and dowel holes.

Completely assembled, up-side-down, for precision fitting of discharge gate.

In tip-top condition, painted, skidded, ready for shipping.

Masters Of BANBURY REBUILDING

Save You Time and Money

Operating a worn, leaky Banbury is costly. You are mixing extra dollars in with each batch of stock because of lost materials, imperfect blending, and retarded production:—and, too, there is risk of a complete breakdown.

You would find it much more profitable in every way to have us put your Banbury back in tip-top condition.

Interstate Engineers are on top of every Banbury problem, thoroughly acquainted with all Banbury requirements through 15 years' specialized experience repairing and rebuilding all sizes and types.

Interstate-rebuilt Banburys are performing with full satisfaction in many plants throughout the United States, and in foreign countries, too.

Let us tell you about our "Pre-Plan" rebuilding service which saves WEEKS of production time. We guarantee every job. Call us now, be time and money ahead.

* FREE To Banbury Owners

To demonstrate the unequaled abrasion-resistant material we use in "hard-surfacing" rotors, mixing chamber, and rings, we will send FREE to any Banbury owner a unique tool you can make very useful in home or office. Just request on your company letterhead.

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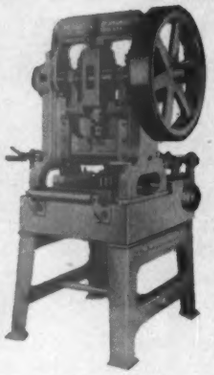
1. MODEL A 1—cutting Heels at high speed production or short runs.

2. Model A 2—cutting Multiple Heels, Half and Full Soles with stock grain.

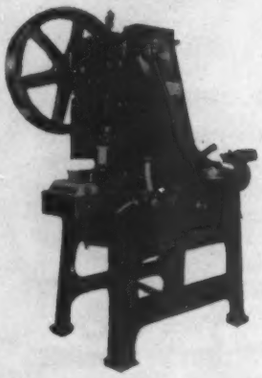
3. Model A 3—cutting Multiple Heels and Taps with or across stock grain.

4. MODEL A2s (Not illustrated) —cutting cross grain of stock.

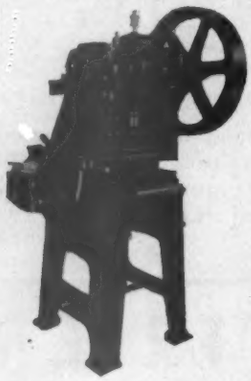


MODEL A2

MODEL A1



MODEL A3



MORE and MORE "UNIFORM QUALITY"

Years of comparisons for wear and service have proven COULTER offers more in higher quality cuttings . . . more in greater production. There is a COULTER MACHINE for cutting volumetric control and stripping of heels, soles, taps and other molded products. Specify a Coulter "Uniform Quality" Machine.

PRODUCTION MACHINES SINCE 1896

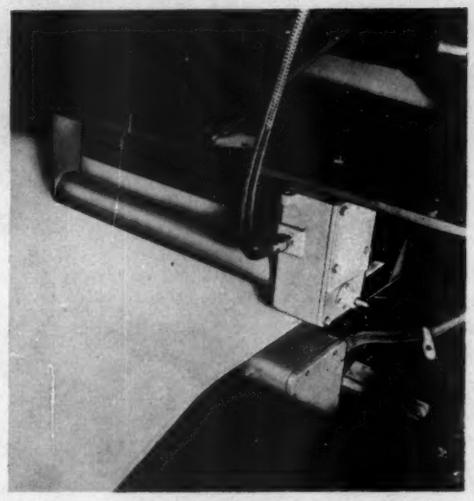
The James COULTER Machine Co.

BRIDGEPORT • CONNECTICUT • U.S.A.

Tracerlab Beta Gauge

The first of a series of industrial measuring and control instruments currently under development using radioactive isotopes has been announced by Tracerlab, Inc., 55 Oliver Street, Boston 10, Mass. Known as the Tracerlab Beta Gauge, the essential components of the gauge are a source of beta radiation from Strontium-90 and a radiation detector.

The sheet material to be measured is interposed between the source and the detector and a part of the radia-



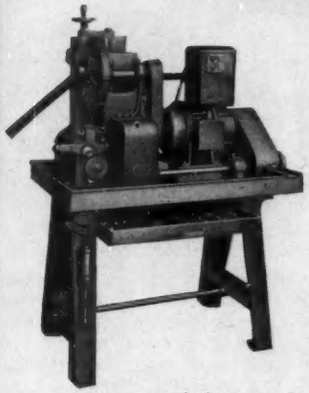
tion is absorbed by the sheet material in proportion to its weight per unit area. Weight per unit area or thickness is read on a properly calibrated recorder connected to the detector. The recorder scale can be calibrated in terms of a plus or minus deviation from specifications or as an absolute thickness or weight reading.

One of the outstanding advantages of these gauges is the fact that no physical contact is made with the material being measured, causing no marking of delicate or easily marred surfaces. A few typical uses of the Tracerlab Beta Gauge are measuring rubber and plastic sheets up to 3/16 inch, paper, textiles, sheet metal and artificial leather.

The Model SM-2 Tracerlab Beta Gauge uses a Brown Electronik Recorder and the gauge standardizes itself automatically every 30 minutes. The inherent accuracy of the Beta Gauge is ± 0.05% of sample thickness or ± 0.03 mg./cm.^{2}, whichever is larger. The amount of drift occurring between standardization periods is within the limits of inherent accuracy of the instrument. Long-life batteries are used as a power supply to eliminate the need for a closely regulated AC power supply. Maximum sensitive length of the gauge is 15 inches while its minimum sensitive length is ¼-inch.

An interesting new **velocity limiting valve** for use where top limits of flow velocity and volume are desired has been introduced by Pneu-Trol Devices, Inc., of Chicago, Ill. Easily connected into any air or gas line, the valve, when set to any of its infinite number of pressure calibrations, instantaneously shuts off line flow whenever the velocity or volume exceeds the desired setting. A typical application is its use in air ejection of pieces from multiple cavity molds.

For Immediate Shipment..
Thropp Automatic



Washer Cutters

THE Thropp Automatic Washer Cutter does not require mandrels. It will cut washers for hose connections, bottle stoppers, plumbers' washers, synthetics, uncured stock for molds, etc. A single unskilled operator can run one or more of these machines at the same time. Size of Cuts: ¼" in diameter to 1¾" inclusive, and from 3/32" to 1½" in length.

Capacity: 100 cuts per minute on long lengths and big diameters; and 200 cuts per minute on narrow widths and small diameters.

Shipment: Shipment can be made from stock on a limited number of units complete with motor and control, wired and ready for installation.

- *West Coast Rep.:* H. M. Royal, Inc., Los Angeles, Cal.
- *Export Agent:* Steinhardter & Nordlinger, 105 Hudson St., N.Y.

THROPP

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DU PONT
RPA's
Rubber Peptizing Agents

REDUCE BREAKDOWN TIME AND COST

IMPROVE PROCESSING PROPERTIES

INCREASE CAPACITY OF PROCESSING EQUIPMENT

No. 2—for natural rubber

No. 3—for natural rubber and "low temperature" GR-S

No. 3—RO—reodorized

No. 5—for regular GR-S

DU PONT RUBBER CHEMICALS
E. I. DU PONT DE NEMOURS & CO. (INC.)
WILMINGTON 98, DELAWARE
BETTER THINGS FOR BETTER LIVING ...THROUGH CHEMISTRY

NRM COST CUTTING EQUIPMENT

- **MODEL 49 TIRE BUILDING MACHINES** sequence timed for high output and balanced uniform product
- **AUTOMATIC BIAS CUTTERS** fast sequence cutting of various predetermined ply widths
- **PRECISION TREAD CUTTERS** accuracy within 1/16" to eliminate recutting
- **TUBE BUTT SPLICING MACHINES** Goodyear and Weldstitch types
- **TIRE SHAPERS — BAGGERS** Vacuum and pressure types for all sizes of tires
- **EXTRUDERS** advanced design for rubber and plastics

and a wide variety of special machinery employed in the production of tires and tubes

- **TIRE AND TUBE MOLDS**

NATIONAL RUBBER MACHINERY CO.
General Offices: AKRON 8, OHIO

Creative Engineering

Rubber-Flo

WILL KEEP YOUR MOLDS

as clean as

---a whistle

Clean Molds are an essential factor in rubber molding

Manufacturers have found that Rubber-Flo Mold Lubricant will keep molds cleaner for a longer period . . . increasing production and reducing maintenance costs.

RUBBER-FLO is safe! It is a non-toxic odorless mold lubricant.

RUBBER-FLO is quick! It may be sprayed, brushed or dipped onto the mold or onto the stock before molding. It will not clog a spray gun.

RUBBER-FLO is economical! The savings in maintenance more than pay for it.

RUBBER-FLO is low in cost! It comes in concentrated form and is diluted with water for use.

PREVENTIVE MAINTENANCE CO.

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Write for your FREE sample today!

REVIEWS

BOOKS

The House of Goodyear (1949 Edition). By Hugh Allen. Published by the Corday & Gross Co., 1771 East 25th St., Cleveland 14, Ohio. 6 x 9 in. 708 pp. $3.00.

Extensively revised, the latest edition of "The House of Goodyear" commemorates the fiftieth anniversary of the company. It is aptly sub-titled "Fifty Years of Men and Industry." Comprising 24 chapters, it is divided into three sections, as follows: (1) Building a World-Wide Company, (2) Goodyear in World War II, and (3) Postwar Developments. In addition, there is a chronology of rubber at the end of the book and an extensive cross-referenced index.

Like previous editions, this book is more than the story of a single business house; it is virtually the story of the birth, growth and amazing development of the rubber manufacturing industry. It traces the struggles of the company at the turn of the century; outlines early policies on wages and working conditions; describes the evolution of the tire, depicts the role played by Goodyear in World War II, not only in the manufacture of military rubber products, but in the aeronautical and other fields, and finally discusses postwar plans.

Well written, liberally illustrated and clearly presented, the latest edition of the Goodyear story is recommended reading for every member of the rubber manufacturing field.

•

Colloid Chemistry (Second Edition). By Harry Boyer Weiser. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 6 x 9¼ in. 444 pp. $5.50.

The second eidtion of this work, like the first, has been written with a three-fold purpose: (1) To acquaint the student with the foundations of colloid chemistry and with the role that the classical experiments have played in the development of the modern theories and applicaions of the subject, (2) To formulate systematically and to correlate critically the theories underlying colloidal chemical behavior, and (3) To illustrate the widely diversified applications of the principles of colloid chemistry in such fields as the industrial arts, agriculture, and biology.

The book has twenty-six chapters, divided into six sections, as follows: (1) Adsorption; (2) Sols; (3) Gels; (4) Emulsions and Foams; (5) Aerosols and Solid Sols; (6) Applications of Colloid Chemical Principles to Contact Catalysis and Dyeing. There are also author and subject indexes. References to both natural and synthetic rubber are made in various sections of the book.

•

Symposium on Aging of Rubbers. Published by the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Penna. 6 x 9 in. 72 pp. $1.75, with paper binding; $2.40, with cloth binding.

The papers and discussion presented as a Symposium on Aging of Rubbers held at the 1949 Spring Meeting of the A.S.T.M. in Chicago on March 2, 1949, under the auspices of Committee D-11 on Rubber and Rubberlike Products, are included in this volume. There were six papers in all, as follows: (1) Mode of Attack of Oxygen on Rubber, by A. M. Neal and J. R. Vincent; (2) Oxygen-Absorption Methods—Their Utility and Limitations in the Study of Aging, by J. Reid Shelton; (3) Chemical Changes in Elastomers and Antioxidants during Aging, by John O. Cole; (4) Physical Aspects of the Aging of Rubbers. by M. C. Throdahl; (5) Effects of Light and Ozone on Rubber, by John T. Blake; (6) Effect of Temperature on the Air Aging of Rubber Vulcanizates, by M. G. Schoch, Jr., and A. E. Juve. In addition, there is an introduction by G. C. Maassen, who was chairman of the symposium committee.

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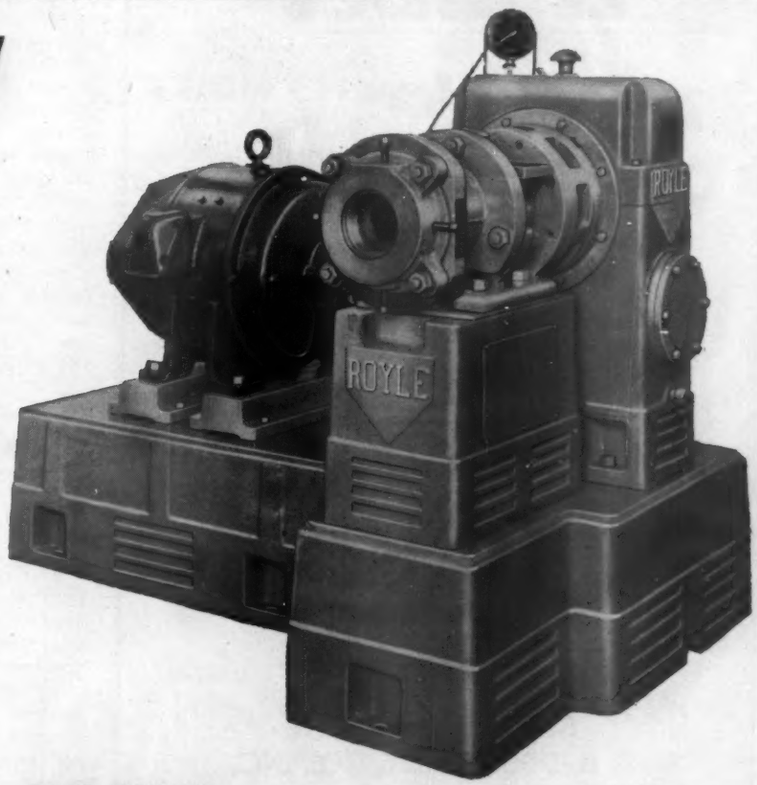

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REVIEWS (CONT'D)

Training Employees and Managers for Production and Teamwork. By E. G. Planty, William S. McCord, and C. A. Efferson. Published by the Ronald Press Co., 15 East 26th St., New York 10, N. P. 6¼ x 9¼ in. 278 pp. $5.00.

Prepared by three experts in the field of labor and management relations, this is a hard-hitting manual with down-to-earth know-how designed to demonstrate that the goals of teamwork and production in business and industry "can best be achieved by a training program designed to improve both the skills and attitudes of employees and of managers." By subjecting present-day training to a comprehensive and critical examination and by indicating the ever-expanding area of the field, the book represents a useful guide to all those engaged in training work, as well as to executives, managers and directors of personnel and industrial relations. Students, too, preparing to enter management, personnel or training fields will find the book of immense value.

The book is divided into three parts. Part I treats with the broad concepts which have developed in recent years in the field of business and industrial training; Part II deals with the organization and administration of training; Part III covers training programs and methods. Dealing with practical operations, the latter section tells how to do the job. Recommendations are supported by examples chosen from successful training programs. There are 21 chapters in all, plus a list of selected references and a subject index.

•

Who's Who in Plastics. Compiled and published by the Society of the Plastics Industry, Inc., 295 Madison Ave., New York 17, N. Y. 6¼ x 9¼ in. 244 pp. $4.50 for SPI members; $5.50 for non-members.

This is a comprehensive index for all who wish to check the affiliation, experience and training of persons in the plastics industry. The biographical section lists the names of almost 3,000 individuals, their present and past affiliations, data of each, position in each case, and educational background. Another section lists companies by name and address, key officers, products, and methods of manufacture. Included are representatives of molders, laminators, fabricators, extruders, material manufacturers, suppliers, etc. This first edition of "Who's Who in Plastics" has a blue and gray block-style cover accentuated in appearance by a glossy cellulose acetate facing which has been laminated to it. Type faces used are clear and legible, with Bible stock used to reduce the thickness of the book. It is an admirable first attempt and the SPI merits the thanks of the industry.

BOOKLETS, CATALOGS, etc.

Foxboro Instrumentation. (Bulletin No. 430). Foxboro Co., Foxboro, Mass. 8½ x 11 in. 16pp.

The equipment offered by the company for the measurement and control of pH in industrial processing operations is described and illustrated in this bulletin. A foreword gives a clear and simple explanation of the pH value and its effects, good or bad, on product quality, plant efficiency, and operating profits. Case histories are cited from numerous industrial fields to illustrate the importance of dependable pH control. The theory which is applied in actual pH control instrumentation is explained in text and diagrams. Included in the equipment shown are the appropriate standard Foxboro instruments, the Dynalog (electronic) Recorder, Multi-Record Recorder, and Indicator, and the Model 40 Stabilog Controller. The various types of pH electrodes available, suiting the installation to any process or operating conditions, are illustrated, and complete specifications as well as dimensional drawings are given.

Ucon Fluids and Lubricants. (Form 6500). Special Products Division, Carbide and Carbon Chemicals Corp., 30 East 42nd St., New York, 17, N. Y. 8½ x 11 in. 28 pp.

The various types of "Ucon" polyalkylene glycol lubricants and the uses of these products for the lubrication of many types of machinery, gears, internal combustion engines, rubber products, and instruments are described in this booklet. It also contains information on the uses of Ucon fluids as hyrdaulic fluids; leather conditioning agents; plasticizers, softeners, and solvents; de-emulsifiers; defoamers; and heat transfer fluids. Complete physical properties for both the water-soluble and water-insoluble grades of these synthetic lubricants are presented.

•

E-M Synchronizer: The ABC of Large Induction Motors. (No. 200-SYN-28). Electric Machinery Manufacturing Co., Minneapolis 13, Minn. 8½ x 11 in. 32 pp.

This booklet covers in four parts the basic theory, operation, characteristics and applications, and control of large induction motors. Written by G. L. Oscarson, chief application engineer for the company, the booklet presents a comprehensive, practical, fact-filled treatment of squirrel-cage and wound rotor motors. It has many photographs and cutaway views and has nearly 50 graphs with explanatory figures accompanying the text.

•

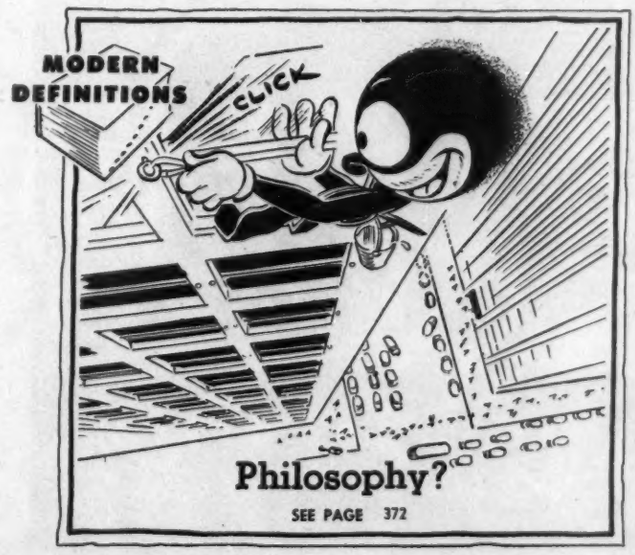
Keckley Steam and Liquid Control Equipment. (Catalog No. 49). O. C. Keckley Co., 400 West Madison St., Chicago 6, Ill. 8½ x 11 in. 64 pp.

This catalog, published to commemorate the thirty-fifth anniversary of the company, features descriptions of precision pressure regulators, temperature regulators, float valves, self-cleaning strainers, water gauges and steam traps. Dimensions of the different units, capacities, engineering tables and specifications are included. Cut-away drawings and photographs serve to illustrate the units under discussion.

•

Studies in Centralized Lubrication: 1949. Farval Corp., 3249 East Eightieth St., Cleveland 4, Ohio. 8½ x 11 in. 8 pp.

The latest techniques and mechanics of centralized lubrication, as offered by Farval, are discussed in this booklet. Various studies of centralized lubrication utilized in different industrial capacities are presented to demonstrate savings in time, money, labor and materials effected. Illustrations are provided which show company units in action.



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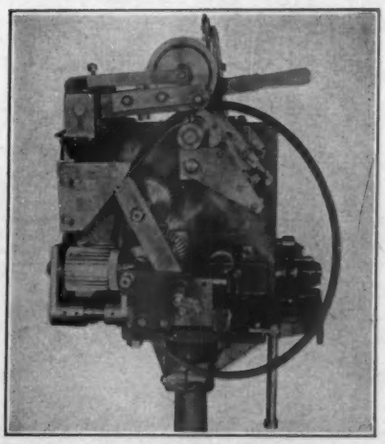

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REVIEWS (CONT'D)

Mono-tert-Butyl-meta-Cresol. (Bulletin No. C-9-139). Chemical Division, Koppers Co., Inc., Pittsburgh 19, Penna. 18½ x 11½ in. 24 pp.

This bulletin describes the physical and chemical properties, the uses, and the chemical reactions of the synthetic organic chemical mono-tert-butyl-meta-cresol, a light colored liquid alkylated phenol. An infra-red spectrogram of Koppers MBMC is included along with commercial information on storage, handling and toxicity. A bibliography of references to technical and patent literature is also offered as is a section devoted to the various chemical reactions of the product.

•

Recording and Controlling Rotameters: Electronic-Electric-Pneumatic. (Bulletin 18-RC). Schutte and Koerting Co., 12th and Thompson Streets, Philadelphia 22, Penna. 8 x 11 in. 12 pp.

This bulletin completely describes the company's line of electronic, electric and pneumatic rotameters. Numerous photographs, cut-away views, sectional drawings and functional diagrams accompany the text material which explains construction, operation and application of the units. Some of the types discussed include recording, controlling, integrating and indicating rotameters.

•

Seiberling Merchandise Catalog: 1949. Diversified Products Division, Seiberling Rubber Co., Akron 9, Ohio. 8½ x 11 in. 52 pp.

This dual purpose merchandise catalog, showing all lines of automobile and truck accessories, lawn and garden supplies, and wheel goods sold by Seiberling, serves both as a wholesale listing for dealer purchasing and as a retail selling catalog. Instructions and ordering information are included. The different items are illustrated, and size charts are provided so that the accessories and supplies may be correctly fitted.

•

Production Time & Cost Savers. (Bulletin No. B8). Triangle Equipment Co., Inc., 45 River Road, Nutley, N. J. 8½ x 11 in. 8 pp.

A discussion of various types of materials handling equipment including overhead cable conveyors, gravity conveyors, all-purpose portable belt conveyors and freight ladders, is provided in this pamphlet. Specifications for the various units are included. Drawings and photographs illustrate the design and the applications to which the equipment may be put.

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Philosophy?
SEE PAGE 372
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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, JULY 11, 1949

Natural Rubber

The price of spot rubber on the Commodity Exchange has swung in a rather narrow range of 50 points since our last report (June 10), high for the period being 16.62 cents reached on June 16 and again on June 27, and low being 16.12 cents reached on July 6. The average price of spot rubber for the month of June was 16.36 cents based on 22 trading days, which compares with an average of 17.92 cents for the month of May.

The Secretariat of the Rubber Study Group estimates that world production and consumption of natural rubber were evenly balanced in May at 115,000 long tons. Production in May was the same as in April, but was down 2,500 tons from May a year ago. May output in Malaya was reported at 52,200 tons, up 2,500 tons from May, 1948. Native rubber exports from Indonesia, however, declined sharply in May, and were calculated at only 16,273 tons, compared with 24,849 tons in April, and 25,448 tons in May, 1948.

World stocks of natural rubber, excluding any Russian holdings, and excluding Government stocks in the United States, the United Kingdom, and France, are estimated at 702,500 tons at the end of May, up 2,500 tons from the previous month, but down 52,500 tons from the end of 1948.

Factors contributing to the lethargic market are slow consumer demand; the good supply of spot rubber held in the United States; swollen tire inventories; absence of buying for the Government stockpile and delayed Congressional action in connection with future appropriations.

Today's quotations on the outside market, London and Singapore follow:

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.16½
October-December	.16⅜
January-March	.16¼
Thin Latex Crepe:	
Spot	.22⅛
July	.22⅛
Thin Brown Crepe, No. 2	.14⅜
Ambers, No. 3	.14⅜
Flat Bark Crepe	.12⅛

London Market
(Standard Smoked Sheets)

September	17.20 - 17.40
October-December	16.75 - 16.85

Singapore Market
(Standard Smoked Sheets)

July	15.62 - 15.82

Synthetic Rubber
(Dry Types-Per Pound)

Butaprene NF	.390 - .415
Butaprene NL	.400 - .425
Butaprene NAA	.440 - .465
Butaprene NXM	.470 - .495
Chemigum 30 N4NS	.400 - .470
Chemigum 50N4NS	.400 - .470
Chemigum N3	.450 - .520
GR-I	—— - .185
GR-S	—— - .185
Hycar OR-25	.450 - .460
Hycar OR-15	.520 - .530
Hycar OS-10	.500 - .510
Neoprene Type E	—— - .650
Neoprene Types CG and AC	—— - .500
Neoprene Types FR and KNR	—— - .750
Neoprene Type S	—— - .320
Paracril 18	.430 - .450
Paracril 26	.440 - .460
Paracril 35	.510 - .530
Silastic (compounded)	2.35 - 4.40
Thiokol Type A	.370 - .470
Thiokol Type ST	.750 - .850
Thiokol Type FA	.520 - .620
Thiokol PR-1	.750 - .850

Scrap Rubber

Market conditions for scrap rubber continue at an extremely low level. Seasonal vacation periods have also contributed to the decline in activity suffered these past months. Trade sources are hesitant to predict any upswing in conditions in the months that lie ahead. Prices for scrap rubber remain at substantially the same levels. Current quotations follow:

Mixed passenger tires	ton	$12.00
Beadless truck tires	ton	nom.
Mixed truck tires	ton	13.00
Beadless passenger tires	ton	nom.
No. 1 passenger peelings	ton	42.50
No. 1 truck peelings	ton	42.50
Red passenger tubes	lb.	.06½
Black passenger tubes	lb.	.03½
Mixed passenger tubes	lb.	.03½
No. 2 truck tubes	lb.	nom.
Red truck tubes	lb.	.06½
Black truck tubes	lb.	.03¼
Buffings	ton	15.00

Reclaimed Rubber

Consumption of reclaim for the month of May is estimated at 18,315 tons by the U. S. Department of Commerce. This compares with 18,649 tons consumed in the month of April. The ratio of reclaim consumption to total new rubber consumption continues at a level substantially below that established the year before. Prices for reclaim have been adjusted to reflect present market conditions. Current quotations follow:

Tires

Black, Digester (Natural)	lb.	.08¼ - .08¾
Peels No. 1	lb.	.08½ - .09¼
Whole Tire (Blend)	lb.	.08¼ - .08¾

Inner Tubes

Black (Natural)	lb.	.11½ - .12
Red (Natural)	lb.	.13¾ - .14½
Butyl	lb.	.08¼ - .08¾

Shoe

Unwashed (Natural)	lb.	.08¾ - .09¼

Cotton Tire Fabrics

Seasonal vacation periods have contributed to what has otherwise been an extremely low period in the cotton tire fabric market. The export of cotton tire fabrics has been practically nil, with foreign exchange difficulties still a major factor. In view of current conditions, price levels have been revised downward. Current quotations follow:

Standard, Peeler, 12/4/2	lb.	.68
Standard, Peeler, 14/4/2	lb.	.70
Standard, Peeler, 16/4/3	lb.	.7250
Extra Staple, Peeler, 12/4/2	lb.	.8315
Extra Staple, Peeler, 14/4/2	lb.	.8575
Extra Staple, Peeler, 16/4/3	lb.	.8825

Chafers

14.4 oz. (per sq. yard)	lb.	.67
9.25 oz. (per sq. yard)	lb.	.6325
11.65 oz. (per sq. yard)	lb.	.60
8.9 oz. (per sq. yard)	lb	.6475

Cotton

The price of middling uplands on the Cotton Exchange has swung in the rather narrow range of 68 points since our last report (June 10), high for the period being 33.80 cents reached on June 22, and low being 33.12 cents reached on June 27. The average price of middling uplands for the month of June was 33.56 cents based on 22 trading days, which compares with an average of 33.73 cents for the month of May.

The Senate has unanimously approved a bill which would restrict cotton acreage in 1950, and also impose marketing quotas if the farmers favored the plan. Also being considered in the Senate is a bill to revise the Aiken-Hope law. Secretary of Agriculture Brannan told a Senate committee recently that he would use subsidy payments on cotton instead of crop loans if Congress gave him the authority to do so. It is contended in cotton circles that even if the cotton plan is costly it might bring about a freer movement of cotton in to consumption, and place cotton on a competitive basis with rayon and other fibers.

London reports that Britain will not use her gold to purchase cotton. Sir Stafford Cripps told Parliament that Britain's standstill order on spending dollars would continue for at least three months, and certainly until after the scheduled talks with U. S. Secretary of the Treasury Snyder.

A possible effect of the threatened devaluation of the pound might be to stimulate interest in an international commodity agreement on cotton, similar to that on wheat which recently became effective.

Quotations for middling uplands on the Exchange follow:

	June 10	July 11		
	Close	High	Low	Close
October	32.91	29.53	29.45	29.50
December	28.95	29.40	29.33	29.37
March	28.83	29.32	29.95	29.29

Closing Rubber Prices on New York Commodity Exchange
(No. 1 R.S.S. Contract)

FROM JUNE 11 TO JULY 11

Date	Spot	July	Sept.	Dec.	Mar.	Sales
June						
11	——	——	——	——	——	——
12	——	——	——	——	——	——
13	16.38	16.33	16.23	16.01	15.8[illegible]	.2
14	16.38	16.20	16.15	15.76	15.50	126
15	16.25	16.25	16.18	15.95	15.70	67
16	16.62	16.40	16.35	16.10	15.85	177
17	16.38	16.25	16.20	16.00	15.75	26
18	——	——	——	——	——	——
19	——	——	——	——	——	——
20	16.58	16.35	16.25	16.15	15.90	77
21	16.50	16.58	16.50	16.33	16.08	92
22	16.38	16.45	16.38	16.20	15.95	99
23	16.38	16.40	16.30	16.15	15.85	40
24	16.50	16.45	16.35	16.20	15.85	39
25	——	——	——	——	——	——
26	——	——	——	——	——	——
27	16.62	16.60	16.50	16.25	15.90	148
28	16.25	16.22	16.05	15.81	15.60	65
29	16.25	16.10	15.95	15.71	15.50	108
30	16.38	16.35	16.25	16.10	15.75	131
July						
1	16.38	16.40	16.35	16.25	15.80	83
2	——	——	——	——	——	——
3	——	——	——	——	——	——
4	——	——	——	——	——	——
5	16.25	16.25	16.18	16.05	15.60	19
6	16.12	16.15	16.07	15.97	15.66	33
7	16.18	16.16	16.05	15.94	15.55	165
8	16.25	16.25	16.20	16.07	15.68	86
9	——	——	——	——	——	——
10	——	——	——	——	——	——
11	16.50	16.55	16.43	16.30	15.92	38

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Latex and Latex Compounds

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STATISTICS *Of Interest to the Rubber Industry*

U. S. Imports and Re-Exports of Natural Rubber

	GROSS IMPORTS												
	Natural Rubber (Dry)			Natural Rubber (Latex)			Guayule				RE-EXPORTS		TOTAL NET IMPORTS
Year	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Long Tons	Total Declared Value	Average Declared Value per pound Cents	Total Gross Imports Long Tons	Long Tons	Total Declared Value	Long Tons
1936	467,064	152,072,496	14.54	19,852	6,659,899	14.98	1,229	286,552	10.41	488,145	12,581	4,488,223	475,564
1937	574,600	237,307,041	18.44	23,185	10,213,670	19.67	2,694	745,873	12.36	600,479	7,902	3,885,433	592,577
1938	397,620	125,357,730	14.07	11,878	4,147,318	15.59	2,485	623,819	11.21	411,983	5,652	1,799,124	406,331
1939	469,803	167,558,245	15.92	27,438	10,467,552	17.03	2,232	463,345	9.27	499,473	13,125	5,832,618	486,348
1940	780,820	303,117,726	17.33	33,789	14,593,466	19.28	3,634	758,007	9.31	818,243	7,060	3,197,136	811,183
1941	989,329	401,890,393	18.14	34,798	15,965,627	20.48	4,881	1,145,767	10.48	1,029,008	5,376	2,757,872	1,023,632
1942	265,980	112,377,896	18.86	10,646	5,630,667	23.61	5,523	1,660,792	13.42	282,149	10,856	5,913,386	271,293
1943	50,348	31,364,033	27.81	1,890	1,312,202	30.99	7,679	3,636,789	21.14	59,917	22,587	16,446,707	37,330
1944	103,820	73,908,389	31.78	3,091	2,092,211	30.22	6,700	3,351,233	22.33	113,611	9,739	8,712,695	103,872
1945	134,454	95,850,441	31.82	4,773	3,115,853	29.14	10,040	5,963,797	26.52	149,267	9,509	7,201,746	139,758
1946	366,415	222,552,939	27.12	8,421	5,843,085	30.98	5,344	2,859,246	23.89	380,180	7,711	5,331,954	372,469
1947	690,954	306,919,456	19.83	17,722	9,820,080	24.91	2,880	1,492,825	20.30	711,556	4,122	2,354,494	707,434
1948	702,293	290,849,177	18.49	32,762	18,288,223	24.92	302	71,330	10.53	735,357	6,672	3,259,324	728,685
1947:													
Oct.	46,898	14,819,306	13.11	3,081	1,370,242	19.85	....	.....	....	49,979	134	.64,620	49,665
Nov.	48,952	16,962,935	15.46	1,994	1,042,644	23.13	....	.....	....	50,946	514	289,752	50,432
Dec.	69,158	24,458,323	15.21	2,438	1,280,834	23.45	....	.....	....	71,596	371	215,958	71,225
1948:													
Jan.	76,723	29,782,199	17.33	4,130	2,044,850	22.11	....	.....	....	117,906	334	206,103	117,572
Feb.	51,528	21,027,604	18.06	2,400	1,420,676	26.43	43	10,235	10.53	53,971	290	170,339	53,681
Mar.	68,848	27,902,550	18.09	3,148	1,730,014	24.02	25	6,845	10.05	72,021	467	215,156	71,554
Apr.	38,433	15,136,536	17.35	2,284	1,260,932	24.65	30	7,076	10.53	40,747	343	190,815	40,404
May	37,227	14,409,747	17.28	3,442	1,915,744	24.84	40	9,435	10.53	40,709	1,031	485,941	39,678
June	62,376	25,338,739	18.13	2,288	1,335,173	26.05	60	14,152	10.53	64,724	718	348,043	64,006
July	60,070	25,206,980	18.07	3,654	2,002,902	24.48	100	23,587	10.53	63,734	466	243,774	63,268
Aug.	65,736	26,975,557	18.33	2,395	1,389,495	25.81	....	.....	....	67,771	520	268,912	67,251
Sept.	49,119	21,480,244	19.52	1,434	813,347	25.24	....	.....	....	50,553	514	229,016	50,039
Oct.	58,300	26,161,356	20.03	2,728	1,574,419	25.83	....	.....	....	61,028	675	320,570	60,353
Nov.	49,800	22,292,055	19.98	813	466,095	25.59	....	.....	....	50,613	772	349,315	49,841
Dec.	83,419	35,495,327	19.00	4,216	2,366,959	24.75	....	.....	....	87,635	569	250,540	87,066
1949:													
Jan.	66,575	27,037,698	18.13	1,132	634,165	25.02	....	.....	....	67,707	757	320,036	66,950
Feb.	55,234	21,549,791	17.41	2,159	1,030,107	21.30	....	.....	....	57,393	434	211,323	56,959
Mar.	53,768	20,095,422	16.68	2,809	1,564,383	24.87	....	.....	....	56,577	562	245,780	56,015
Apr.	48,262	18,167,840	16.85	2,271	1,219,404	23.97	....	.....	....	50,533	315	165,632	50,218

Source: U. S. Department of Commerce.
Notes: (1) Figures for latex are on a dry weight basis. (2) Figures for re-exports include natural rubber (dry and latex) and guayule.

Natural Rubber
(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1936	488,145	575,000	12,581	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1947:				
Aug.	44,672	47,289	191	130,040
Sept.	46,241	50,557	174	122,097
Oct.	49,340	57,286	314	114,115
Nov.	50,840	52,076	514	110,752
Dec.	71,414	56,284	371	129,038
1948:				
Jan.	80,564	58,174	334	136,227
Feb.	54,418	51,012	290	148,081
Mar.	72,070	54,444	467	130,295
Apr.	40,947	50,616	343	123,248
May	40,709	52,022	1,031	112,724
June	64,725	55,701	718	119,818
July	63,775	48,769	466	128,446
Aug.	68,131	53,366	520	129,622
Sept.	50,556	52,131	514	123,912
Oct.	61,027	49,617	675	118,187
Nov.	50,671	51,632	746	113,251
Dec.	87,634	45,985	569	141,541
1949:				
Jan.	67,706	50,188	757	125,050
Feb.	57,401	46,285	434	118,803
Mar.	56,577	53,108	562	117,664
Apr.	50,533	47,859	315	112,916
May	.....	45,928	...	111,668

Source: 1936-40, U. S. Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

U.S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

	Balata		Jelutong		Gutta-Percha & Other Guttas	
Year	Tons	Value	Tons	Value	Tons	Value
1936	535	199,368	6,163	1,296,364	1,568	555,643
1937	354	151,344	7,109	2,017,786	1,122	440,894
1938	509	181,140	9,132	2,944,504	444	204,582
1939	694	265,553	6,640	1,603,418	1,740	539,255
1940	648	300,500	7,451	2,449,137	2,340	1,004,885
1941	924	489,514	8,821	2,954,001	1,783	607,025
1942	1,544	1,107,059	1,200	530,296	804	525,763
1943	1,047	708,701	35	14,840	....	.....
1944	1,012	660,805	86	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1947:						
Oct.	210	389,245	352	187,255	35	88,776
Nov.	290	302,164	148	106,443	15	53,202
Dec.	172	189,934	412	240,023	42	77,371
1948:						
Jan.	56	35,973	481	289,506	69	94,854
Feb.	145	90,023	307	209,015	66	84,839
Mar.	283	189,933	436	271,314	51	101,691
Apr.	82	36,570	651	393,280	52	68,366
May	45	36,109	512	314,432	24	54,191
June	67	36,885	277	211,373	45	41,277
July	120	87,327	205	170,949	15	35,001
Aug.	59	50,511	112	107,431	53	39,607
Sept.	91	67,970	112	83,432	0	0
Oct.	83	67,726	145	181,424	0	0
Nov.	86	49,155	48	36,634	20	10,572
Dec.	83	56,896	106	108,975	24	12,324
1949:						
Jan.	46	29,922	91	93,738	19	11,934
Feb.	65	53,665	77	91,362	9	16,328
Mar.	136	86,499	60	52,313	5	30,967
Apr.	88	48,244	14	8,753	16	9,878

Source: U. S. Department of Commerce.

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Synthetic Rubber—Totals

(GR-S, Neoprene, Butyl, and Buna N Types)

(All Quantities in Long Tons)

Year	Production	Imports	Consumption	Exports	Stocks On Hand at End of Period
1941	8,383	.....	6,259	572	1,702
1942	22,434	.....	17,651	1,419	4,612
1943	231,722	.....	170,891	18,148	41,568
1944	762,630	11,043	566,670	104,266	142,927
1945	820,373	10,407	693,580	83,778	203,454
1946	740,026	7,709	761,699*	72,920	114,963
1947	508,702	1,093	559,566	11,385	62,366
1948	488,343	15,671	442,072	4,874	115,111
1948:					
June	41,207	.....	39,204	264	89,088
July	41,267	9	34,511	257	96,140
Aug.	39,630	3,599	39,339	276	97,197
Sept.	37,890	2,403	39,215	628	98,246
Oct.	41,419	2,014	38,367	451	102,842
Nov.	40,779	1,988	37,690	366	107,297
Dec.	42,133	1,450	35,446	475	115,111
1949:					
Jan.	38,890	927	36,765	623	118,357
Feb.	36,103	1,170	34,611	335	118,932
Mar.	36,063	1,436	38,746	963	116,843
Apr.	35,445	881	36,454	506	114,944
May	32,335	...	35,365	...	113,010

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures shown include the output of both government and privately-owned plants. (3) Figures for 1941 are estimated. * Includes year-end adjustment of 5,384 tons to cover non-reporting companies.

Synthetic Rubber—By Type

(All Quantities in Long Tons)

New Supply

	GR-S (Buna S)	GR-M (Neoprene)	GR-I (Butyl)	Buna N Types	Total
1942	3,721	8,956	23	9,734	22,434
1943	182,259	33,603	1,373	14,487	231,722
1944	679,949	56,660	20,252	16,812	773,673
1945	724,859	45,672	52,378	7,871	830,780
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014

Consumption

1942	2,579	6,833	22	8,217	17,651
1943	131,977	26,205	304	12,405	170,891
1944	495,552	46,243	10,763	14,112	566,670
1945	600,145	42,394	43,012	8,029	693,580
1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072

Exports

1942	222	1,037	..	160	1,419
1943	14,937	2,540	40	631	18,148
1944	98,380	4,799	530	557	104,266
1945	76,555	5,837	980	406	83,778
1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	385	4,874

Stocks at End of Period

1942	1,050	1,786	4	1,772	4,612
1943	30,975	6,415	1,033	3,145	41,568
1944	116,130	11,739	9,892	5,166	142,927
1945	170,571	9,703	18,378	4,802	203,454
1946	81,483	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111

Source: Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (2) Figures for GR-M and Buna N Types include production of privately-owned plants.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1942	1943	1944	1945	1946	1947	1948	1949
Jan.	49,216	36,085	47,540	52,008	51,746	57,057	61,308	63,083
Feb.	42,666	36,274	47,754	48,856	47,654	50,551	56,487	57,934
Mar.	50,820	41,586	52,263	55,364	56,703	59,947	68,171	73,118
Apr.	49,554	48,177	50,005	59,024	62,111	64,140	72,183	75,279
May	53,212	49,828	54,230	60,748	66,800	70,865	77,186	.....
June	50,077	53,325	54,266	60,580	63,247	71,329	78,044	.....
July	54,606	49,867	55,119	66,170	60,076	73,441	81,428	.....
Aug.	48,793	51,880	55,618	70,058	66,729	72,089	80,351	.....
Sept.	50,093	49,707	56,318	64,529	62,268	71,384	76,159	.....
Oct.	50,094	53,111	53,154	55,708	66,637	73,277	75,164	.....
Nov.	50,729	50,703	54,967	53,543	61,345	64,158	72,560	.....
Dec.	39,250	48,695	52,250	49,745	61,101	67,506	72,162	.....
Total	589,110	568,238	633,482	696,333	735,417	795,015	871,200	.....

Source: U. S. Bureau of Mines.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude [a]	Exports	Stocks On Hand at End of Period
1936	150,571	141,486	24.6	7,085	19,000
1937	185,033	162,000	29.8	13,233	28,800
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007[b]	254,820	64.6	30,405	42,532
1943	304,058[c]	291,082	59.6	15,678	46,201
1944	260,631[d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1948:					
Feb.	23,678	22,374	25.9	1,273	38,444
Mar.	24,089	24,362	26.0	937	38,313
Apr.	21,802	22,322	26.2	1,049	37,946
May	21,043	21,975	25.2	948	36,612
June	22,504	23,786	25.1	925	35,898
July	17,712	19,291	23.2	712	34,302
Aug.	20,255	22,917	24.7	643	32,025
Sept.	21,805	23,478	25.7	740	30,198
Oct.	23,859	23,512	26.7	848	31,879
Nov.	23,050	22,170	24.8	1,210	33,378
Dec.	21,396	20,122	24.9	900	34,702
1949:					
Jan.	19,741	19,031	21.9	991	32,868
Feb.	18,270	17,712	21.9	1,012	32,738
Mar.	19,991	19,508	21.2	1,054	33,397
Apr.	18,463	18,649	22.1	1,070	32,825
May	18,025	18,315	22.5	....	32,338

Source: 1936-40, Department of Commerce; 1941 to date, Rubber Division, OMD, and Predecessor Agencies.

Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. ([a]) Includes natural and synthetic rubber. ([b]) Includes 893 tons of imports. ([c]) Includes 67 tons of imports. ([d]) Includes 21 tons of imports.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1930	2,784,745	571,241	3,355,986				
1931	1,973,090	416,648	2,389,738	1940	3,692,328	721,637	4,413,965
1932	1,135,491	235,187	1,370,678	1941	3,744,500	875,381	4,619,681
1933	1,573,512	346,545	1,920,057	1942	220,814	133,083	353,897
1934	2,177,919	575,192	2,753,111	1943	0	4,501	4,501
1935	3,252,244	694,690	3,946,934	1944	0	124,819	124,819
1936	3,669,528	781,862	4,451,390	1945	83,792	313,643	397,435
1937	3,915,889	892,382	4,808,271	1946	2,148,699	930,760	3,079,459
1938	2,000,985	485,852	2,486,837	1947	3,558,178	1,220,634	4,778,812
1939	2,866,796	704,308	3,571,104	1948	3,909,270	1,363,856	5,273,126
1948:							
Jan.	305,081	99,200	404,281	July	356,764	116,780	473,544
Feb.	274,847	107,054	381,901	Aug.	348,782	111,760	460,542
Mar.	349,998	140,606	490,604	Sept.	301,170	111,224	412,394
Apr.	308,071	128,963	437,034	Oct.	383,756	107,352	491,108
May	225,461	111,789	337,250	Nov.	364,440	103,837	468,277
June	312,406	117,572	429,978	Dec.	378,455	107,702	486,157
1949:							
Jan.	326,019	104,599	430,618	July	.....	.....	.....
Feb.	324,547	101,700	426,247	Aug.	.....	.....	.....
Mar.	402,402	115,171	517,573	Sept.	.....	.....	.....
Apr.	436,392	106,212	542,604	Oct.	.....	.....	.....
May	394,703	86,200	480,903	Nov.	.....	.....	.....
June	.....	.....	.....	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.

Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Rim Production

	1944	1945	1946	1947	1948
Passenger Car	1,748,917	4,504,368	15,058,469	21,346,004	23,842,796
Truck & Bus	6,391,441	6,386,652	5,939,244	7,737,353	6,920,231
Agricultural	297,301	1,441,909	1,735,992	2,633,699	3,140,882
Earth Mover	703	1,308	5,520	10,610	13,330
Total	9,138,362	12,434,237	22,739,225	31,727,666	33,917,239

	1948	1949				
	Dec.	Jan.	Feb.	Mar.	Apr.	May
Passenger Car	2,199,967	2,037,345	1,847,304	2,277,001	2,276,658	2,337,844
Truck & Bus	584,768	516,123	497,135	516,577	362,643	359,700
Agricultural	273,831	290,645	283,344	310,204	242,123	205,805
Earth Mover	1,629	1,676	1,797	757	478	1,055
Total	3,060,195	2,845,789	2,629,580	3,104,539	2,881,902	2,904,404

Source: The Tire & Rim Association, Inc.

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(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1937 (total)	22,353	29,886	1,246	53,485	53,310	10,383
Passenger Car	20,055	26,177	696	46,928	46,497	8,745
Truck and Bus	2,298	3,709	550	6,557	6,813	1,638
1938 (total)	11,516	30,567	1,049	43,132	40,907	8,451
Passenger Car	10,086	27,104	580	37,770	35,789	6,937
Truck and Bus	1,430	3,463	469	5,362	5,118	1,514
1939 (total)	18,208	38,022	1,279	57,509	57,613	8,665
Passenger Car	15,742	33,471	607	49,820	49,933	7,108
Truck and Bus	2,466	4,551	672	7,689	7,680	1,557
1940 (total)	22,252	35,346	1,176	58,774	59,186	9,127
Passenger Car	19,560	30,903	411	50,874	50,965	7,270
Truck and Bus	2,692	4,443	765	7,900	8,221	1,857
1941 (total)	24,780	39,895	1,489	66,164	61,540	4,436
Passenger Car	19,855	34,119	586	54,560	50,392	3,165
Truck and Bus	4,925	5,776	903	11,604	11,148	1,271
1942 (total)	6,680	8,872	207	15,759	15,351	6,247
Passenger Car	910	2,734	38	3,682	2,790	4,432
Truck and Bus	5,770	6,138	169	12,077	12,561	1,815
1943 (total)	6,128	18,547	225	24,900	20,423	1,883
Passenger Car	82	10,606	71	10,759	7,620	1,132
Truck and Bus	6,046	7,941	154	14,141	12,803	751
1944 (total)	6,654	26,439	263	33,356	33,446	2,013
Passenger Car	208	18,330	130	18,668	18,819	1,218
Truck and Bus	6,446	8,109	133	14,688	14,627	795
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949:						
Feb. (total)	2,172	2,588	105	4,865	5,891	12,385
Passenger Car	1,819	2,086	31	3,936	4,782	10,180
Truck and Bus	353	502	74	929	1,108	2,205
Mar. (total)	2,519	3,229	155	5,903	6,578	13,091
Passenger Car	2,156	2,693	49	4,899	5,361	16,670
Truck and Bus	363	536	105	1,005	1,216	2,421
Apr. (total)	2,771	3,718	121	6,611	6,959	13,190
Passenger Car	2,427	3,202	38	5,667	5,940	10,705
Truck and Bus	345	516	84	944	1,020	2,485
May (total)	2,380	4,324	120	6,824	6,934	13,301
Passenger Car	2,103	3,764	41	5,909	5,981	10,769
Truck and Bus	277	559	79	915	953	2,532

Source: The Rubber Manufacturers Association, Inc.

Cotton, Rayon and Nylon Tire Fabrics

(Production in Thousands of Pounds)

	Cotton: Tire Cord Not Woven	Cotton: Cord Fabric Woven	Cotton: Chafer and All Other Tire Fabrics	Cotton: Total	Rayon and Nylon [b]: Tire Cord Not Woven	Rayon and Nylon [b]: Tire Cord And Other Tire Fabrics	Rayon and Nylon [b]: Total
1946:							
Jan.-Mar.	17,128	39,377	15,245	71,750	a	51,208	51,208
Apr.-June	19,622	40,197	18,623	78,442	a	52,511	52,511
July-Sept.	17,279	39,259	18,787	75,325	5,102	46,932	52,034
Oct.-Dec.	20,660	42,668	21,708	85,036	5,858	50,589	56,447
Total	74,689	161,501	74,363	310,553	10,960	201,240	212,200
1947:							
Jan.-Mar.	21,972	49,377	21,815	93,164	5,322	52,059	57,381
Apr.-June	23,491	53,746	16,480	93,717	5,486	47,360	52,846
July-Sept.	15,571	44,291	14,596	74,458	6,161	51,719	57,880
Oct.-Dec.	18,183	48,532	17,762	84,477	6,550	55,078	61,628
Total	79,217	195,946	70,653	345,816	23,519	206,216	229,735
1948:							
Jan.-Mar.	18,546	50,251	19,391	88,188	a	60,569	60,569
Apr.-June	15,585	45,385	18,213	79,183	a	59,759	59,759
July-Sept.	29,743	45,927	c	75,670	a	63,642	63,642
Oct.-Dec.	13,321	34,424	15,879	63,624	a	65,258	65,258
Total	77,195	175,987	53,483	306,665	.....	249,228	249,228
1949:							
Jan.-Mar.	d	33,213	26,494	59,707	a	68,926	68,926
Apr.-June	.....	.....	.....	.....	.....	.....	.....
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: U. S. Bureau of the Census.

Notes: (a) Included with tire cord and fabrics to avoid disclosures of operations of individual mills. (b) Fuel cell fabrics are not included with rayon and nylon tire cord and fabrics. (c) Included with tire cord not woven. (d) Included with chafer and all other tire fabrics.

Automotive Inner Tubes

(Thousands of Units)

	Shipments: Original Equipment	Shipments: Replacement	Shipments: Export	Shipments: Total	Production	Inventory End of Period
1936	21,514	32,188	721	54,423	57,036	10,945
1937	22,464	29,554	749	52,767	52,373	10,312
1938	11,515	28,134	644	40,293	37,848	8,166
1939	18,190	31,998	1,002	51,190	50,649	7,036
1940	22,172	29,070	972	52,214	52,237	7,017
1941	24,722	33,749	1,232	59,703	57,433	4,686
1942	6,895	7,213	159	14,267	12,685	6,206
1943	6,350	12,474	189	19,014	15,014	2,626
1944	6,460	20,569	196	27,224	27,488	2,813
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,839	40,494	1,125	68,457	70,150	9,734
1948:						
Oct.	2,432	3,537	91	6,061	6,323	8,915
Nov.	2,344	2,694	86	5,123	5,463	9,303
Dec.	2,290	2,308	124	4,722	5,034	9,734
1949:						
Jan.	2,298	2,531	97	4,926	5,062	9,815
Feb.	2,168	2,160	76	4,404	4,922	10,442
Mar.	2,513	2,565	95	5,174	5,948	11,231
Apr.	2,767	2,552	78	5,396	6,059	11,748
May	2,380	2,830	87	5,296	6,088	12,410

Source: The Rubber Manufacturers Association, Inc.

Smoked Sheets—Spot Closing Prices

(New York Market—Cents per pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1910	288	141	206.60	1930	16½	7½	11.98
1911	184	114	141.30	1931	8⅛	4¼	6.17
1912	140	108	121.60	1932	4¼	2½	3.49
1913	113	59	82.04	1933	9⅞	2⅞	5.96
1914	93	56	65.33	1934	15⅞	8¾	12.92
1915	79	58½	65.85	1935	13¾	10½	12.37
1916	102	55	72.50	1936	23	13½	16.41
1917	90	52	72.23	1937	26⅞	14	19.39
1918	70	40	60.15	1938	17⅞	10¼	14.64
1919	57	38½	48.70	1939	24	14⅛	17.57
1920	56½	16	36.30	1940	24	18¼	20.10
1921	21¼	11½	16.36	1941	24⅜	19⅛	22.40
1922	28⅜	13⅝	17.50	1942	22½	22½	22.50
1923	37⅛	24¾	29.45	1943	22½	22½	22.50
1924	40⅛	17⅜	26.20	1944	22½	22½	22.50
1925	121	34⅜	72.46	1945	22½	22½	22.50
1926	88½	36¾	48.50	1946	22½	22½	22.50
1927	41¾	33	37.72	1947	25	14	20.00
1928	41¾	17	22.48	1948	25	18	21.99
1929	26⅜	15½	20.55				

Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1942	1943	1944	1945	1946	1947	1948	1949
Jan.	19.85	21.34	20.76	22.36	25.49	32.58	36.09	33.37
Feb.	20.05	21.61	21.34	22.29	26.57	33.91	33.63	33.41
Mar.	20.42	21.98	21.65	22.43	27.52	35.89	35.04	33.44
Apr.	21.10	22.02	21.71	21.88	28.40	35.89	38.10	33.84
May	20.88	21.97	21.63	23.30	28.17	36.51	38.57	33.73
June	19.78	21.92	23.31	23.42	29.89	37.83	38.12	33.56
July	20.27	21.46	22.33	23.27	34.11	38.03	34.89	....
Aug.	19.45	21.09	22.11	23.10	36.31	34.83	32.23	....
Sept.	19.62	21.10	22.10	23.25	37.59	32.21	31.92	....
Oct.	19.79	21.00	22.32	23.85	36.79	32.39	32.01	....
Nov.	20.21	20.32	22.13	24.71	31.50	34.50	32.15	....
Dec.	20.55	20.32	22.28	25.21	33.03	36.74	32.90	....
Average for Year	20.16	21.34	21.89	23.25	31.28	35.11	34.64	....

Consumption of Vinyl Resins

(In Thousands of Pounds)

	Sheeting and Film [a]	Textile and Paper Coating Resins [b]	Molding and Extrusion Materials [b]	All Other [b, c]
1946	52,080	11,673	61,852	27,083
1947	66,430	17,237	73,114	27,064
1948	98,021	31,085	73,598	21,147
1948:				
Sept.	10,298	2,924	5,920	1,845
Oct.	11,364	2,981	5,666	1,859
Nov.	10,099	2,588	6,533	2,014
Dec.	8,761	2,472	7,068	1,808
1949:				
Jan.	10,197	2,847	6,834	2,589
Feb.	9,368	1,979	5,569	2,148
Mar.	11,787	2,384	5,660	2,387
Apr.	12,239	2,490	4,426	2,748

Source: Bureau of the Census.

Notes: (a) Includes weight of fillers, plasticizers, extenders and safety glass sheeting; (b) Resin content; (c) Includes Adhesives, but excludes data for protective coating resins.

OUR SKELETON CREW

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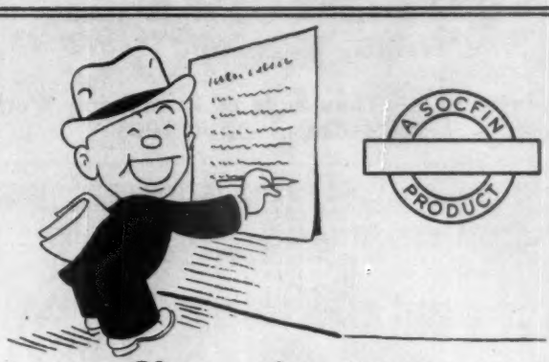

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SYNTHETIC RUBBER PLASTICIZER

A low cost high iodine number petroleum-derived hydrocarbon resin useful as a rubber processing aid.

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SOFT. POINT, R & B, °F	190
IODINE NO., WIJS	200

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An economical light-colored hydrocarbon plasticizer outstanding in its ability to impart superior electrical properties to synthetic rubber. Panaflex BN-I is a complete replacement for dibutyl phthalate as a plasticizer in GR-A rubber.

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Rubber Industry Employment, Payrolls, Wages and Hours

Employment — Thousands of Production Workers and Index (1939 = 100)

	1948				1949			
	All Rubber Products		Rubber Tires & Tubes		All Rubber Products		Rubber Tires & Tubes	
Month	Number	Index	Number	Index	Number	Index	Number	Index
Jan.	210	173.5	101	185.5	191	157.8	88	163.0
Feb.	208	172.0	99	182.4	186	154.1	87	159.5
Mar.	204	168.9	96	177.7	183	151.0	86	158.2
Apr.	198	163.8	93	170.7	177	146.6	..	....
May	195	161.1	91	168.5	...	....	..	....
June	195	161.6	92	169.4	...	....	..	....
July	191	157.7	91	167.6	...	....	..	....
Aug.	195	160.9	92	168.7	...	....	..	....
Sept.	197	162.8	91	168.6	...	....	..	....
Oct.	198	163.5	90	165.9	...	....	..	....
Nov.	199	164.5	91	168.2	...	....	..	....
Dec.	196	161.8	90	165.3	...	....	..	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January-May, 1947, will be shown later.

Payrolls — Production Workers Pay Rolls Unadjusted Index (1939 = 100)

	1947		1948		1949	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	386.3	416.3	354.9	344.4	320.6	294.5
Feb.	385.0	413.3	337.2	315.4	309.8	288.8
Mar.	374.3	397.3	320.6	292.4	297.8	287.8
Apr.	383.9	414.2	312.8	286.4	....	....
May	367.2	399.3	318.9	305.7	....	....
June	342.3	356.2	330.2	322.0	....	....
July	331.2	350.0	329.7	329.8	....	..
Aug.	337.6	355.5	347.2	341.0	....	....
Sept.	348.3	355.3	344.9	326.2	....	....
Oct.	354.4	354.7	345.5	318.2	....	....
Nov.	361.4	362.4	341.9	312.9	....	....
Dec.	373.6	365.6	332.7	299.6	....	....

Note: Figures from June, 1947, to date have been revised to adjust them to levels indicated by Federal Security Agency data for 1946; revisions for January, 1946, through May, 1947, will be shown later.

Wages — Average Weekly Earnings

	1947		1948		1949	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$54.03	$59.78	$57.33	$62.72	$56.89	$60.78
Feb.	54.06	59.90	54.70	58.22	56.40	61.21
Mar.	52.97	58.05	53.24	55.54	55.57	61.56
Apr.	55.23	61.64	53.39	56.54	55.31	....
May	55.30	61.12	55.45	61.15	....	....
June	55.49	61.35	57.14	63.96	....	....
July	55.74	62.06	58.37	66.30	....	....
Aug.	55.92	61.15	60.47	68.29	....	....
Sept.	57.76	64.75	59.31	65.27	....	....
Oct.	57.62	63.78	59.19	64.82	....	....
Nov.	57.99	64.86	58.27	62.79	....	....
Dec.	59.47	65.74	57.68	61.10	....	....

Wages — Average Hourly Earnings

	1947		1948		1949	
Month	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes	All Rubber Products	Rubber Tires & Tubes
Jan.	$1.330	$1.511	$1.444	$1.646	$1.501	$1.721
Feb.	1.331	1.517	1.421	1.613	1.504	1.723
Mar.	1.330	1.512	1.408	1.599	1.502	1.719
Apr.	1.397	1.608	1.412	1.603	1.507	....
May	1.416	1.622	1.424	1.636	....	....
June	1.419	1.615	1.439	1.651	....	....
July	1.445	1.640	1.472	1.684	....	....
Aug.	1.445	1.640	1.500	1.730	....	....
Sept.	1.447	1.661	1.504	1.732	....	....
Oct.	1.436	1.644	1.507	1.734	....	....
Nov.	1.453	1.661	1.508	1.735	....	....
Dec.	1.454	1.658	1.499	1.721	....	....

Hours — Average Weekly Hours per Worker

Month	1947	1948	1949	Month	1947	1948	1949
January	40.6	39.7	37.9	July	38.6	39.7	...
February	40.6	38.5	37.5	August	38.7	40.3	...
March	39.8	37.8	37.0	September	39.9	39.4	...
April	39.5	37.8	36.7	October	40.1	39.3	...
May	39.0	39.0	...	November	39.9	38.6	...
June	39.1	39.7	...	December	40.9	38.5	...

Source: U. S. Department of Commerce. Note: These figures are revised from time to time and the latest available issue should be consulted for the most accurate data.

Indexes of Production, Shipments and Inventory For The Rubber Industry

Production 1935-1939 = 100 (Based on man-hours)

Month	1947	1948	1949	Month	1947	1948	1949
Jan.	247	223	193	July	207	200	...
Feb.	246	215	187	Aug.	210	207	...
Mar.	239	205	181	Sept.	217	205	...
Apr.	234	200	176	Oct.	223	205	...
May	220	201	...	Nov.	225	203	...
June	216	205	...	Dec.	230	200	...

Shipments—Average Month 1939 = 100 (Based on $ Value)

Jan.	301	282	291	July	298	339	...
Feb.	326	289	283	Aug.	312	351	...
Mar.	332	252	285	Sept.	346	345	...
Apr.	320	312	...	Oct.	354	344	...
May	309	317	...	Nov.	354	322	...
June	322	342	...	Dec.	307	318	...

Inventory — Average Month 1939 = 100 (Based on $ Value)

Jan.	229	271	295	July	268	289	...
Feb.	241	283	300	Aug.	258	287	...
Mar.	253	302	302	Sept.	246	288	...
Apr.	270	293	...	Oct.	247	284	...
May	279*	296	...	Nov.	242	288	...
June	277	295	...	Dec.	257	289	...

Source: U. S. Department of Commerce.

Various Compounding Materials Consumed by the Rubber Industry

Material	1941	1942	1943	1944	1945	1946	1947
Asphalt [a]							
Short tons	20,536	22,263	16,510	20,189	19,483	28,715	32,113
% of total	0.6	0.6	0.5	0.6	0.5	0.7	0.7
Barite (Barytes):							
Short tons	9,800	6,334	8,000	10,000	10,000	20,000	17,000
% of total	4.2	3.6	3.9	2.9	2.1	4.4	3.1
Carbon Black:							
Short tons	219,751	147,974	236,737	369,015	402,193	470,732	471,790
% of total	88.5	88.5	90.3	94.6	95.5	95.3	94.3
Clay, Kaolin:							
Short tons	127,055	51,334	50,964	59,588	109,936	162,393	166,201
% of total	11.6	5.1	5.5	6.8	11.7	12.3	11.5
Clay, Fire & Stoneware:							
Short tons	9,000	5,000	10,259	7,160	7,800	12,951	17,970
% of total	0.2	0.1	0.2	0.1	0.1	0.2	0.2
Lead Sulfate, Basic:							
Short tons	200	89	131	268	200	.....	.....
% of total	1.9	1.1	2.3	4.2	3.2	..	..
Lime:							
Short tons	3,058	1,381	2,039	5,634	7,170	3,193	.....
% of total	0.05	0.02	0.05	0.13	0.10	0.1	..
Litharge:							
Short tons	3,968	3,460	4,302	3,023	1,864	2,131	.....
% of total	3.3	3.8	3.8	2.2	1.3	1.6	..
Lithopone:							
Short tons	3,547	1,047	1,078	726	977	1,607	3,085
% of total	2.0	0.8	0.8	0.5	0.7	1.1	1.9
Mica, Ground:							
Short tons	3,476	1,754	3,063	1,137	3,715	4,951	3,900
% of total	8.0	3.7	6.0	2.2	7.1	8.0	6.0
Sulfur:							
Short tons	63,000	40,000	51,000	63,000	64,960	72,800	....
% of total	2.4	1.4	1.8	1.9	2.0	2.2	..
Talc [b]							
Short tons	58,114	40,487	48,994	51,833	63,758*	65,980	.....
% of total	13.9	10.0	11.8	13.0	16.0	14.4	..
Zinc Oxide:							
Short tons	90,429	52,717	67,898	59,518	63,447	83,776	.....
% of total	63.4	53.0	47.4	42.3	49.6	53.1	..

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes pyrophyllite and ground soapstone. * Revised.

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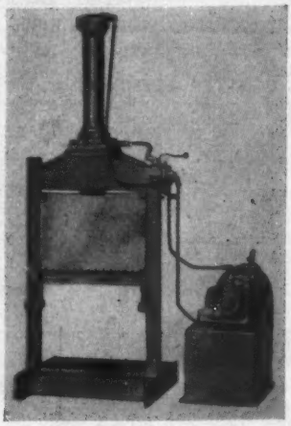

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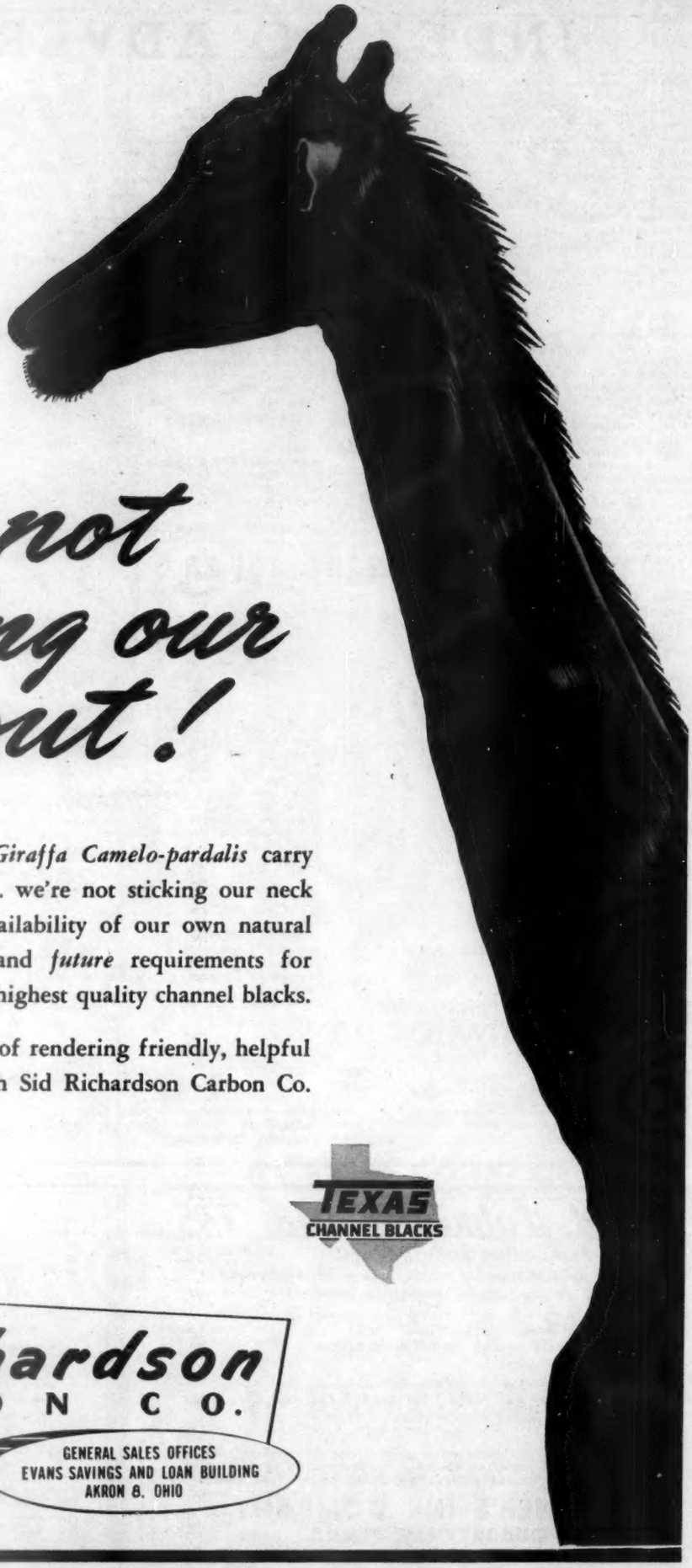

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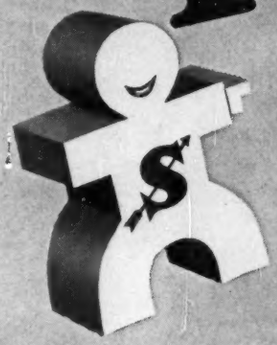

We are prepared at all times to buy and sell scrap in quantity, serving extruding plants, molding plants, fabricators, laminators and virgin plastic suppliers.

We are prepared to do grading, screening, washing, and custom-mixing of thermoplastics in our factory to customers' specifications. Some materials we handle in volume are: Polyvinyl chloride, Polyvinyl acetate, cellulose acetate, etc. A. Schulman, Inc. will give prompt attention to your inquiries

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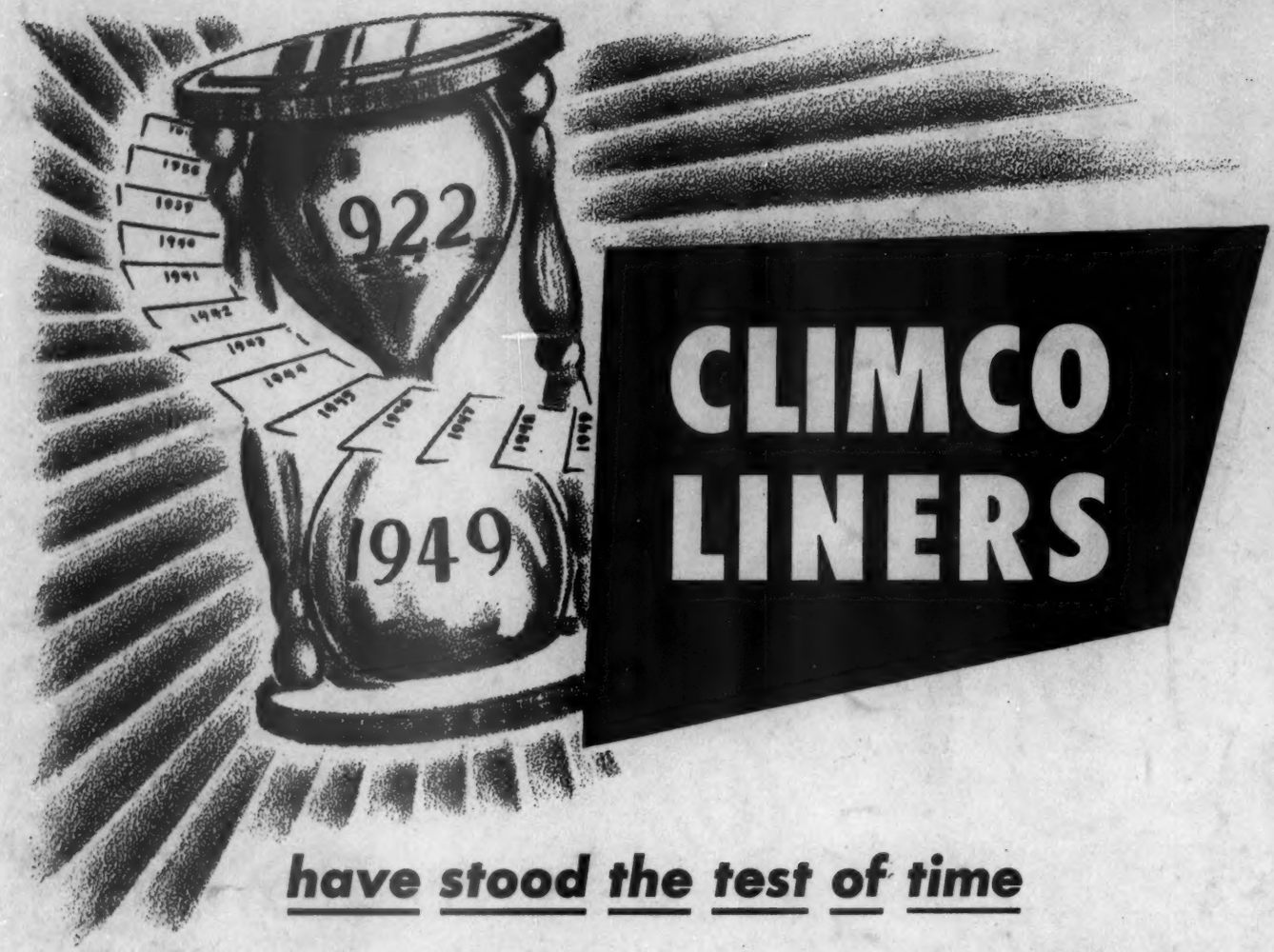

have stood the test of time

In the last quarter of a century, changes in the rubber industry have been widespread; yet during all these years, Climco Processed Liners have maintained their unrivaled popularity... Briefly, here are the advantages of Climco Processing:

FASTER, CHEAPER PRODUCTION

By eliminating stock adhesions and insuring better separation of stock and liner, the work moves faster. Labor and power costs are cut, because re-rolling for cooling and cleaning of liners is eliminated, handling is reduced and horizontal storage is facilitated.

BENEFITS TO STOCKS

Freshness and tackiness are preserved, while lint and ravelings are eliminated. Air, moisture and sunlight are excluded, and oxidation, mould and bloom are prevented. Climco Processing also increases liner life several times.

Once you have tried these processed liners, you will soon be convinced it pays to *standardize* on CLIMCO.

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